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THE PSYCHIATRIC SIDE OF REHABILITATION.[1]

By W. H. TRETHOWAN, M.B., M.R.C.P., D.P.M.

Department of Psychiatry, University of Sydney.

IN this paper the primary concern is not with the rehabilitation of psychiatric patients but with those who have some fairly clearly defined physical disability, in whom rehabilitation does not proceed according to plan. Investigation of such patients frequently reveals that the principal factor interfering with their progress is some emotional disturbance or underlying disturbance of personality.

While it is probably true to say that there is no physical disability severe enough to require active rehabilitation which does not carry with it an additional load of emotional or psychological stress, this, in a great many cases, tends to correct itself automatically during the process of physical rehabilitation. Whether it does so depends, presumably, on the patient being basically of sound personality. It should not be assumed that when a coexistent neurotic reaction to a disability exists it will necessarily correct itself, for this may often prove subsequently not to be the case. On the whole it may be said that the practice of leaving the emotional aspects of a physical disability to attend to themselves is too widely accepted, proper consideration being given to them only when the patient who is undergoing active rehabilitation fails to show the active response. However, the fault lies not with those whose main task is to rehabilitate, but more with those who are initially responsible for diagnosis and treatment. While it would obviously be illogical for a patient with an orthopædic disability to be sent for rehabilitation without this having been fully explored and assessed, it would appear just as illogical, when dealing with a patient who has a coexistent personality disturbance, not to subject it to detailed investigation so that its likely effects upon him and on his physical disability may become better understood.

One of the main differences between physical and psychiatric handicaps has been pointed out by Lewis (1945), who states:

> Those who have a surgical disability or who are partially deprived of one of their special senses have a well-defined and constant limitation of function; for a wide variety of specified jobs they can be trained as readily as a man or woman of the same age could be trained for any new task of comparable difficulty. But psychiatric handicaps which are so often personality handicaps are not limited; they may fluctuate and may themselves greatly interfere with re-training for any job at all.

On this occasion Professor Lewis was contrasting psychiatric with physical rehabilitation, and he specifically endeavoured to exclude those patients with both kinds of

[1] Extracted from a paper read at a seminar for medical officers of the Commonwealth Department of Social Services on November 18, 1957.

disability. However, when both occur in one individual at the same time much of what Lewis has said is still applicable, with the additional qualification that in such patients the two different aspects have, as may often be observed, a reciprocal relationship or a dependence on one another. By this it is implied that when one looms large the other tends to appear small. This is perhaps yet another reason why an underlying personality disorder giving rise to a neurotic reaction to physical illness may not appear greatly significant until active steps are taken to deal with the physical side. It also provides grounds for objection to the well-worn phrase "functional overlay". This term not only furthers the dichotomy which the psychosomatic approach endeavours to refute, but also implies that the emotional or psychological aspect is static and fixed rather than dynamic and variable.

This leads to consideration of psychosomatic disorders in general, a consideration which is also applicable to many other physical disorders not usually considered to be primarily psychosomatic. What emerges is the finding that a physical disability may be an expression of an emotional disturbance, which, so long as it receives this form of expression, remains concealed. The most obvious example of this occurs in conversion hysteria. Here the patient may develop some gross symptom such as hysterical paraplegia and in so doing may rid himself of some underlying anxiety or emotional difficulty with which he appears otherwise unable to cope. Although the disability is in a sense self-produced, the mechanism of its production is largely unconscious; thus the patient seems to be without insight into why he has become ill or what he gains from the situation. This, in summary, is the process of conversion—conversion of something essentially emotional or psychic into something which has a physical appearance. The interchangeability between the two is illustrated first by the patient's curiously dispassionate emotional attitude to his physical disability, which is epitomized by the term "*belle indifférence*", and secondly by the discovery that sudden forced removal of the physical disability by persuasion, hypnosis or other means often renders the underlying emotional disturbance immediately overt. In short, conversion may represent a flight or escape from one kind of illness into another.

In so-called psychosomatic disorders a similar process appears to be at work, but with certain basic differences. The first of these is that the lesions which occur lack the quality of self-production of the hysterical conversion symptom; secondly, they tend to be structural rather than functional; when functional they involve the autonomic rather than the voluntary nervous system; thirdly, that the time relationship between the occurrence of symptoms and the personality disorder is less exact; and fourthly, that the interchangeability between the two is less striking. Nevertheless, a disorder such as duodenal ulcer is clearly in many cases a defence. For example, an ambitious, overconscientious individual may, on attaining a position of responsibility, find that he has bitten off more than he can chew, or having got almost within reach of his goal fear that he lacks the ability to ensure its final achievement. To those who cannot admit this to themselves such a morsel may be hard to swallow or if swallowed prove indigestible. The analogy is deliberately chosen, for in predisposed individuals there is clearly a link between mental and physical indigestion. The development of a psychosomatic disorder may therefore, among other things, provide a means of escape from a situation which threatens to become intolerable, for as everyone knows failure to achieve an ambition on account of illness, particularly physical illness, is no cause for censure. Even if such a development is not a satisfactory defence, and this is seldom the case, it may at least be a physical expression of a deep-rooted conflict.

However, there s a third kind of patient not far removed from either of those described, who suffers a physical mishap due largely to some external environmental influence, and who at some period during his illness or convalescence starts to use his disability, one again largely unconsciously, as a method of escape from a previously existing emotionally difficult situation—one which has remained up to this time unresolved. This mechanism borders on conversion hysteria and also on that underlying psychosomatic illnesses, and although somewhat different from either has some features common to both. The following case provides an illustration of this.

Report of a Case.

A woman, aged 25 years, suffered a persistent disability of her right leg. She was known to have been emotionally unstable, having had a breakdown at 14 years of age, which had necessitated several months in hospital, but from which she had made an apparently reasonable recovery. At the age of 19 years she fell from her horse and injured her right knee, after which a cartilage was removed. This did not result in complete cure, for three years later a second operation became necessary, which was, however, apparently attended by some infection. Although there was no definite history of venous thrombosis she was left after this not only with an unstable knee joint, but also with persistent œdema of the leg, which was treated by periods of prolonged immobilization. On examination, while it was quite clear that although her leg was swollen and tender and that a very real physical disability was present, her complaints of pain and weakness were disproportionately severe. It was also observed that she had so far completely resisted all attempts at effective mobilization. What further emerged was that the patient was more irritable, easily upset and depressed than she should have been, and that she was suffering also from insomnia and lack of appetite. On investigation of her social situation it was discovered that she was the youngest unmarried daughter of a large family and had been left by her siblings to take the responsibility of caring for her elderly invalid parents. However, when the patient herself became ill some of the other members of the family were forced to assist. The situation in which the patient found herself rendered her unable to achieve the independence to which she felt she was entitled, this failure being further enhanced by her own preexisting emotional difficulties. It seemed, therefore, that she had chosen to escape from her situation by becoming and remaining ill and making use of an accidentally acquired physical disability for this purpose.

Such a psychiatric investment in a physical disability is unfortunately fairly commonplace. Furthermore, any attempt to rehabilitate such a patient is doomed to failure unless some satisfactory steps can be taken to give the patient insight into her difficulties and also effect some satisfactory manipulation of the environment. Although not impossible, it is difficult to give such a patient true insight, one reason at least being that an admission by the patient to herself or to others that the prolongation of her physical disability, either in whole or in part, is in a sense due to herself and a reflection of her own inadequacies and not to mere mischance, may be intolerable, particularly if the situation is of long duration. To attempt to break down a defence of this type by direct frontal assault may be disastrous and in any event is likely to throw up other and just as intractable defences. If it is attempted, what often transpires is that the patient claims bitterly that the doctor who is treating her is trying to make out that her symptoms are imaginary. This leaves the way open for a direct expression of hostility, which in turn may lead the doctor to become exasperated and equally hostile to the patient and finally to reject her as hopeless or impossible. Immediately the doctor does this he begins in a sense to partake of the patient's neurosis, though admittedly consideration has to be given to the practical situation which allows a doctor to spend so much time and no more with any one patient. A further difficulty arises from the fact that by the time a patient of this kind falls into the hands of someone who decides to make a serious attempt to rectify a situation now clearly out of hand, the disorder has usually been present for a very long time. It is because of this that it was stated earlier that the uncovering of intrinsic emotional or psychological difficulties in a physically disabled patient should preferably take place at the very beginning, either when the initial diagnosis is made or at least by the time treatment is started. Furthermore, efforts to deal with such psychological difficulties should proceed hand in hand with efforts to correct or minimize the physical disability. To wait until the patient has undergone a series of operations or various physical manœuvres before commencing psychological exploration is often too late to ensure ready success.

Another all too familiar case not far removed from the example already given is the patient who has sustained some injury at work, as a result of which there is some persistent disability and the question of compensation has arisen. As is well known, the prospect of compensation appears to be a highly significant contributory cause leading to the exacerbation and prolongation of the results of injuries and accidents of all kinds. Unfortunately there appears to be no ready solution, for in a patient in whose case the matter of compensation is outstanding for a long period there is a tendency for his disability to become highly resistant to treatment and for the patient to become equally resistant to rehabilitation. Even when the matter of compensation is satisfactorily settled the disability may still prove largely intractable. In such cases it is probable that the mechanism is the same as that referred to earlier; the patient cannot get better because getting better after compensation is paid and not before implies the possibility of admission that the patient himself has been in some way responsible for prolonging or exaggerating his disability and that to admit this would be to lose face. A further difficulty in treating such patients adequately is that they are often persons with below average intelligence who cannot for this reason cooperate adequately in psychotherapy. It is of course in part because such patients are of limited intelligence that the state of affairs occurs in the first place, for any intelligent person can usually perceive that although the possibility of compensation may be attractive, it is much better to make every effort to overcome a disability and return as quickly as possible to the business of normal living, even if this implies a possible reduction in the amount of recompense ultimately made.

However, there is another important factor to be considered. This is that patients who develop a traumatic or compensation neurosis or, because of this, a more intractable disability, are apart from intelligence clearly of abnormal or poor personality prior to the occurrence of the traumatic incident. Those who are emotionally stable and mature do not develop compensation neuroses even though the accidents from which they suffer may justify compensation and this in fact is paid.

Such examples of investment in a physical disability as a defence against emotional difficulties or to ensure compensation are clearly very much akin to conversion hysteria. Although such a patient cannot be considered primarily responsible for his illness, nor for that matter can the hysteric, it is clear that sooner or later an element of conversion enters into the picture.

The key to understanding such disabilities and their underlying mechanisms lies in obtaining as full a knowledge as possible of the patient's pre-morbid personality. In short, it is essential to know not only what kind of disability the patient has and how it affects function, but also to study the personality and life situation of the disabled individual. This can be said to be the psychiatrist's prime role in rehabilitation, though it should not be left in his hands alone.

Something needs to be said of psychiatric diagnosis under these circumstances. Diagnosis should not merely mean attaching a well-worn, traditionally accepted label. Such static diagnosis has no proper place here; on the contrary that which is required must be essentially dynamic, taking into account not only personality factors and their development, but also having regard to the patient's social background and environment. As Grayson (1952) has stated:

> Diagnosis must bring together the facts learned from the social worker, from the psychologist, from the physician and above all from the patient himself, into an integrated whole. Diagnosis is directed primarily at the psychological assets of the individual and only secondarily at his disabilities. If for technical purposes a label is put on an individual one must be very specific as to what the label means in terms of rehabilitation.

In regard to the place of psychotherapy in the rehabilitation of the physically disabled, certain general principles may be evoked. The first is that although the psychotherapeutic process may be largely non-directive in itself, there should always be a clear definition of the goal which it is thought reasonable to attempt to reach in any particular individual case. This again is clearly bound up in adequate diagnosis. For example, no one would embark on the process of rehabilitation of a badly crippled patient with the view of making him an Olympic athlete. This is so patently obvious as to be hardly worth mentioning. However, when a psychiatric disability exists side by side with some physical incapacity, it is perhaps insufficiently realized how hard it may be for the patient to overcome the former, possibly because of its more intangible nature. It is equally difficult for an insecure, immature, neurotically disturbed individual to attain complete normality of psychic function as it is for the cripple to play a good game of tennis. This does not mean that the emotionally disturbed person cannot achieve, with adequate help, a very considerable success in the business of living. However, it does mean that the goal in front of him should not be beyond his potential capacities. The very presence of an unattainable goal may itself defeat the process of restoring the patient to his best functioning level.

It appears likely that of all psychotherapeutic disciplines group psychotherapy has a special place in the rehabilitation of the disabled. This, while still a relatively new technique, is clearly a fruitful one. Not only does it save time, but also within a properly handled group it appears that patients will often discuss certain emotionally loaded topics which they may find more difficult to air in a conventional psychiatric interview. This may be specially true of patients who are inclined to regard themselves as physically disabled rather than as having primarily psychiatric problems. The interaction of one member of the group with another and of groups within the group also seems to favour the uncovering of emotionally charged material otherwise largely concealed. The dispelling of emotional tensions appears also to be favoured by the discovery that others not only have difficulties of the same kind but also have difficulties of different kinds. While it is tempting to go into this matter in greater detail, it is not possible at the present time, owing to the fact that the underlying theory of the interaction of individuals with a group situation needs further exploration. It might be said, of course, that the therapeutic effect of the group situation is not confined merely to a formal setting, but takes place whenever persons who have disabilities which resemble one another to some extent are thrown together. However, the effect is greatly enhanced by the adequate guidance of a skilled therapist.

Conclusion.

In conclusion, certain points perhaps deserve reemphasis. First, when a psychiatric diagnosis is relevant, it should be made before the rehabilitation process is begun, either at the stage of initial assessment or preferably even before the patient is sent for rehabilitation. Secondly, because of the way in which physical disabilities tend to provide cover for emotional disturbances and even on occasions to replace them, it should never be assumed, because there is no immediately apparent psychiatric problem, that one does not exist. The possibility of investment of underlying personality difficulties into physical illness so that the latter comes to be used as a defence against the former should be borne in mind. Thirdly, if there is evidence of coexistent emotional problems it may be incorrect to suppose that these can safely be allowed to look after themselves or will automatically disappear as the physical disability resolves. In this respect the possibility of a reciprocal relationship needs to be considered. Lastly, the existence of problems such as these points strongly to the need for the continuous cultivation of the habit of regarding the patient as an individual with a disability, not as a disability to be treated as if it were in some way autonomous, having little real connexion with the person suffering its effect. This, while undoubtedly true of all patients whatever the nature of their illnesses, would appear specially applicable to those undergoing rehabilitation.

References.

LEWIS, A. (1945), "Psychiatric Advice in Industry", *Brit. J. Indust. Med.*, 2: 41.

GRAYSON, M., POWERS, A., and LEVI, J. (1952), "Psychiatric Aspects of Rehabilitation", Rehabilitation Monograph, 2, The Bellevue Medical Center, The Institute of Physical Medicine and Rehabilitation, New York University.

THE SIGNIFICANCE OF EPILEPSY IN ADULTS.

By J. N. SEGELOV,
Honorary Assistant Neurosurgeon,
AND
W. LISTER REID,
Honorary Neurosurgeon-in-Chief, Neurosurgical Department, Royal Prince Alfred Hospital, Sydney.

IT has long been known that epileptic seizures commencing for the first time in adulthood are suspicious of tumour of the brain. However, in many such patients this rule is ignored by the practitioner because, at the start of the illness, no abnormality is found on physical examination of the nervous system, or because there has been a previous head injury, or because there is hypertension, or, worse still, because the seizures are controlled by anticonvulsant drugs. Indeed, in several of our patients, as we shall show later, the significance of their seizures was completely overlooked, and although they appeared outwardly normal for several years after their epilepsy commenced, an underlying tumour was allowed to progress insidiously. Nothing was done until some major physical sign appeared, such as an aphasia or hemiplegia, by which time the patient was often beyond surgical aid.

If a person develops epilepsy some time after a head injury, it does not follow that the seizures are due to the trauma; and also epilepsy in a hypertensive patient is seldom due to the raised blood pressure, as we shall show from the present series. Such patients must be thoroughly investigated before the hypertension or the trauma is diagnosed as the cause of their epilepsy. Similarly, a negative finding in a physical examination of the nervous system is no reason for preferring to overlook the importance of the seizures, as many tumours in silent areas of the brain give no sign whatsoever to the clinician in their early stages. Furthermore, the fact that the seizures are controlled by anticonvulsant drugs, whilst comforting to the patient and the physician alike, does not exclude the possibility of a tumour being the underlying cause.

Examination was made of the case records of 60 adults who were admitted to the neurosurgical unit at Royal Prince Alfred Hospital, Sydney, under the care of one of us (W.L.R.). All had suffered from epileptic seizures as the first symptom of their illness, and all were admitted after a varying time for neurosurgical investigation and treatment. From these case records we intend to show some of the "red herrings" in the history and examination of the patient which may lead one to place other diagnoses ahead of cerebral tumour or to be content with inadequate investigation, and to show some of the consequences of these diagnostic errors.

Review of the Literature.

In 1941, Penfield and Ericson found that 37% of their patients with cerebral tumours had a history of epileptic seizures. However, this figure rose to 80% if the tumour involved the motor area. Surveys were also made by Hoefer *et alii* (1947) and by Nattrass (1949), and they found that 30% of their patients with cerebral tumours had epilepsy, a similar over-all figure to that of Penfield. But when they considered those patients with epilepsy as the presenting symptom, they found that the incidence was 68% in patients with astrocytoma, 60% in those with meningioma and 51% in those with glioblastoma.

In 1948, White, Liu and Mixter, discussing focal epilepsy, said that it was found in 50% of patients with astrocytoma, 35% of those with meningioma, 22% of those with glioblastoma, and in 14% of those patients with secondary carcinoma of the brain. These figures emphasize the significance of focal epilepsy, whether it is Jacksonian, temporal lobe or otherwise.

A clear and definite warning comes from Northfield and Russell who, in 1951, when writing on cerebral tumours, maintained that the importance of epilepsy as an early manifestation of glioma could hardly be over-emphasized, and in the astrocytoma and oligodendroglioma group especially it may be the only symptom for many years.

Reports of Cases.

Five patients from the series have been selected because their histories emphasize the salient features of this paper. The case histories have of necessity been greatly condensed, and only the relevant details have been given here. The first of the case reports illustrates not only the importance of early and complete investigation, but also the false confidence inspired by the response of the seizures to anticonvulsants, a fact considered erroneously by many as favouring a diagnosis of idiopathic rather than organic epilepsy.

CASE I.—The patient, a man aged 53 years, was well until February, 1952, when he awoke one morning and found that he had passed urine and fæces during the night without being aware of it. One month later he had a *grand mal* seizure at work. He was examined and no abnormality was found in the nervous system, and an X-ray picture of the skull also appeared normal. No further investigations were performed, and he was treated with phenobabitone for the next 18 months without incident. A further convulsion occurred at work, but treatment was continued unchanged. Three and a half years after his illness commenced he began to find difficulty in concentrating, and his memory became impaired. He had a further seizure, and phemitone ("Prominal") was added to his therapy. Five years and three months from his first seizure he had his first focal attack, in which his head and eyes deviated to the right and his right arm was weak for some hours afterwards. He was then referred for investigation and was admitted to hospital. On examination he had a quadrantic homonymous visual field defect but no papilloedema and no change in his reflexes. The electroencephalogram showed a left temporal disturbance, and an arteriogram demonstrated a huge left temporo-parietal tumour. Biopsy proved it to be an oligodendroglioma, a slowly infiltrating tumour. Because of the involvement of speech and motor areas the lesion was considered at this stage to be inoperable, but earlier full investigation might indeed have enabled some surgery of a curative nature to be performed.

Another common error is to assume that cerebral tumours occur mainly in the "cancer age". However, as a rule they tend to arise some five to 10 years earlier than cancer elsewhere in the body. In this series 20% of the patients with tumours were less than 35 years old. The relative youth of some of these misled their medical attendants, with unfortunate results, as in the following two patients.

CASE II.—The patient, a man aged 32 years, began to take *grand mal* seizures at the age of 21 years. The seizures responded largely to anticonvulsants, and he remained unchanged for the next 11 years, until he began to notice hesitancy in his speech, which soon amounted to a true aphasia. Physical examination showed him to be normal, but an electroencephalogram showed a left temporal abnormality. A ventriculogram revealed a very large left frontal tumour, which, however, had still not caused any rise in intracranial pressure, hence the absence of headaches, vomiting and papilloedema. At craniotomy a cyst which contained 80 millilitres of yellow fluid was found and a subtotal removal of the surrounding tumour was performed. The patient made a good recovery. Histological examination of the lesion showed it to be a relatively inactive astrocytoma. An earlier diagnosis in this case would have given the neurosurgeon an excellent opportunity of obtaining a complete cure rather than palliation.

CASE III.—The patient, a young married man, aged 21 years, was in good health until May, 1957, when he took a series of *grand mal* seizures. These responded to anticonvulsants, and it was not until four months later that, having begun to suffer headaches, nausea, vomiting and loss of concentration, he was referred for investigation. A skiagram of the skull was within normal limits, but angiography revealed a large frontal expanding lesion, which at craniotomy was proved to be a cystic glioma, now beyond the scope of resection. Had an earlier diagnosis been made, there would have been a chance of cure, but now the only therapy remaining at our disposal is irradiation.

It is true that some patients with a late onset of seizures do in fact have a true idiopathic epilepsy, but the next case illustrates again the necessity of continued vigilance

in such patients, as cerebral tumours can and often do remain hidden for many years, during which time epileptic seizures are the only sign of the disorder. This patient also illustrates the need for additional care when focal epilepsy is present, as then cerebral tumour is even more likely to be the cause.

CASE IV.—The patient was a man aged 43 years. Ten years before his admission to hospital he had commenced to take epileptic seizures, which began as twitching in the left arm and leg and progressed to a generalized convulsion. He was investigated in Holland prior to his emigrating here, but no abnormality was found. He was given anticonvulsants which he took continuously until shortly before his admission to hospital, when his left arm and leg became weak and soon progressed to a left hemiplegia. He was referred for investigation, and on his admission to hospital no symptoms or signs of raised intracranial pressure were present, but angiograms revealed a large right parietal tumour, which at craniotomy was found to be an infiltrating astrocytoma. Some relief was obtained from drainage of a cyst in the tumour, but no chance of cure remained, and he died three years later.

From this case it would seem imperative to keep under close observation all patients with focal epilepsy for which no cause can be found. The following is an example of such a patient.

CASE V.—The patient, a woman aged 35 years, had at the age of 29 years, begun to suffer from attacks in which she felt strange, heard strange voices and felt nauseated. These attacks lasted for 10 minutes, and they were premenstrual, ceasing during the amenorrhœa of pregnancy. The attacks have recently become postmenstrual also, and the last attack culminated in a true *grand mal* seizure. Physical examination gave negative results, but an electroencephalogram showed a left temporal focus. The cerebro-spinal fluid was normal, and air studies did not reveal any organic lesion. Although this patient is likely in view of these tests, to be suffering from idiopathic epilepsy, she is being observed carefully and will be readmitted to hospital should her symptoms or signs change.

Analysis of 60 Patients Presenting with Epilepsy.

An examination has been made of the case records of 60 patients admitted to the neurosurgical unit at Royal Prince Alfred Hospital, Sydney, between 1952 and 1957, all these patients having had epileptic seizures at the onset of their illnesses. There were 28 males and 32 females, so that the sex incidence in this series showed no significant disparity. The age incidence (Table I) shows that the largest group were in their forties, but 20% were in their thirties and a similar proportion in their fifties; two patients were in their early twenties, and nine patients were over the age of 60 years. This proves that neither youth nor old age should influence one to make a diagnosis without adequate investigation.

TABLE I.
Age Incidence of Patients on Their Admission to Hospital.

Age (Years).	Number.
20 to 29	2
30 to 39	12
40 to 49	23
50 to 59	14
60 to 69	9

A careful inquiry into the type of seizure is essential when the patient's history is taken, especially to ascertain if there are any focal features, such as twitching of the face, arm or leg at the onset of the attack, since this would be a Jacksonian seizure, indicating some involvement of the motor cortex. If the patient has an aura of unpleasant smells, or of far-away feelings, or of auditory hallucinations, one may suspect the temporal lobe to be the site of the lesion. Transient seizures associated with pallor and a vacant facies are typical of *petit mal*. However, even the most careful interrogation may not enable one to decide definitely into which category the seizure belongs, particularly if the attacks occur only at night or when there are no eye-witnesses. Our findings presented in Table II illustrate these remarks.

The duration of symptoms before patients were admitted to hospital is set out in Table III. No less than 55% of these patients had an interval of more than six months between the onset of their illness and their admission to hospital for proper investigation; 35% of the series were allowed to wait more than a year before being referred, which is hardly justifiable in view of the likelihood of tumour. Unfortunately, most of those admitted to hospital within the first three months of their illnesses had rapidly growing tumours, with paralysis or aphasia following closely on the appearance of the seizures, making the diagnosis quite evident. So, paradoxically, we have those patients with malignant tumours admitted early to hospital, and those with the more surgically amenable lesions admitted late, often too late for a cure. Furthermore, a long history of epilepsy does not mean that tumour is not present, since of the six patients who had a history of more than 10 years' duration, four were proved to have cerebral tumours.

TABLE II.
Types of Seizure.

Type of Seizure.	Number of Patients.
Focal:	
Jacksonian	7
Temporal lobe	4
Paræsthetic	2
Non-focal:	
Petit mal	2
Grand mal	37
Other types	8

TABLE III.
The Duration of Symptoms Before Patients were Admitted to Hospital.

Duration of Symptoms.	Number of Patients.
Less than three months ..	12
Three to six months	15
Six to 12 months	12
One to two years	8
Two to five years	4
Five to 10 years	3
More than 10 years	6

Of the 60 patients in this series, no less than 30 were found to have a cerebral tumour. This, then, was by far the commonest cause of epileptic attacks in adults, while idiopathic epilepsy was the diagnosis in only 13 patients (22%). The diagnoses are set out in Table IV.

Discussion.

In these days of enlightenment when the general public is being educated in early cancer detection and treatment, it is disappointing to find that potentially curable cases of cerebral tumour are not referred to the neurosurgeon until the tumours are quite evidently beyond the curable stage. Examination of the histories of these patients reveals the existence of epilepsy for months or years, and shows how such factors as the age of the patient, the response to anticonvulsants, the absence of abnormality of the nervous system on physical examination, and the absence of advanced signs of cerebral tumour such as headache, vomiting, papilloedema and hemiplegia all combine to persuade the practitioner to regard epilepsy in adults as probably idiopathic rather than probably organic brain disease.

Another misleading feature is the presence of hypertension, which was seen in proportionately more patients

with cerebral tumours than in those without. In some cases it is due no doubt to the association with raised intracranial pressure. In this series there was only one patient in whom a final diagnosis of epileptic seizures due to hypertension was made, and this illustrates the folly of regarding seizures as due to "blood pressure", without making adequate investigation.

Also, it is disappointing to find in these case histories that there is a strong tendency amongst practitioners, in both general and specialist practice, to be content with a physical examination of the nervous system and perhaps an X-ray examination of the skull, this being their total investigation of an adult with epilepsy. Fortunately,

TABLE IV.

Diagnoses of Patients with Epileptic Attacks.

Final Diagnosis.	Number of Patients.
Cerebral tumour:	
Astrocytic glioma (21)	30
Oligodendroglioma (2)	
Meningioma (4)	
Secondary carcinoma (3)	
Idiopathic epilepsy	13
Post-traumatic epilepsy	6
Degenerative disease	7
Syphilis	1
Intracranial abscess	1
Hypertensive encephalopathy	1
Vasovagal syncope	1

electroencephalography is becoming more widely used nowadays, but this test alone is not sufficient and should always be part of a more thorough series of tests. Some doubt still lingers in the medical profession about the safety of angiography as a routine test, but in this unit well over 600 angiograms are being made each year without complication, and a large series has been published in this regard by one of us (Segelov, 1956). It can confidently be stated that facilities for the early diagnosis of cerebral tumours by radiological means have advanced greatly in recent years, and there should be no reason for failing to avail oneself of these tests to make an accurate diagnosis.

A history of head injury or a family history of epilepsy may lead the practitioner to a wrong diagnosis in a patient with epilepsy in adulthood. It is firmly recommended that neither of these factors should be allowed to distract attention from the strongest possibility, that of cerebral tumour.

Conclusions.

We believe that every person who has an epileptic seizure late in life should be investigated to exclude the possibility of an underlying organic lesion. By "late in life" we mean particularly those between the ages of 30 and 50 years, though we believe that the period should really be 20 to 60 years, particularly if there is no family history of epilepsy in the youngest group. We also maintain that proper investigation of such patients consists of an X-ray examination of the skull, electroencephalography, arteriography and, if necessary, air studies of the ventricles. If this is considered radical, then it should be remembered that one in every two of such patients will have a cerebral tumour, and if being radical with investigations will result in earlier diagnosis and treatment then it is good medicine.

Summary.

1. A series of 60 patients is analysed to show the cause of epilepsy commencing for the first time in adulthood.

2. Some case histories from the series are quoted to show how the practitioner may be misled by deceptive features in the patient's history and in his response to drug therapy.

3. In this series 50% of patients were found to have a cerebral tumour.

4. It is recommended that every adult who presents with epileptic seizures of recent onset should be referred for a complete neurosurgical investigation, as one in every two of them will be suffering from a cerebral tumour.

References.

HOEFER, P. B., SCHLESINGER, E. B., and PENNES, H. H. (1947). "Seizures in Patients with Brain Tumors", *A. Research Nerv. & Ment. Dis., Proc.*, 26: 50.

NORTHFIELD, D. W. C., and RUSSELL, D. (1951), "Modern Trends in Neurology", (edited by Feiling), Butterworth, London.

NATTRASS, F. J. (1949), "Clinical and Social Problems of Epilepsy", *Brit. M. J.*, 1: 1.

PENFIELD, W., and ERICSON, T. C. (1941), "Epilepsy and Cerebral Localisation", Baillière, Tindall & Cox, London.

SEGELOV, J. N. (1956), "Safe Angiography", *J. Neurosurg.*, 13: 567.

WHITE, J. C., LIU, C. T., and MIXTER, W. J. (1948), "Focal Epilepsy: Statistical Study of its Causes and Results of Surgical Treatment; Epilepsy Secondary to Intracranial Tumors", *New England J. Med.*, 238: 891.

STONE-FISH STING AND ITS TREATMENT.

By S. WIENER, Ph.D., M.B., B.S.,

Commonwealth Serum Laboratories, Melbourne.

THE stone fish, which is so called because it resembles in water a piece of rock or dead coral, lives in tropical reefs and estuaries throughout the Indo-Pacific regions. In Australia it is found around the tropical coast line from Moreton Bay on the east coast to Houtmans Abrolhos on the west coast (Whitley, 1943). At least three species are recognized, two of which occur in Australian waters, namely *Synanceja trachynis* and *S. verrucosa*.

Along the back of the stone fish are 13 stout spines which are enveloped by a retractile sheath (Figure I). Three anal and two pelvic spines are also present. Firmly attached to the upper part of each spine are two fusiform venom glands (Figure II). Each gland continues as a venom duct along a groove on either side of the spine. These ducts open at the tip of the spine and discharge venom when pressure is exerted on the venom glands.

Because of its effective camouflage and its immobility when approached, a sting may be sustained by accidentally treading on the fish or when turning over a piece of coral. Injury can also occur when handling the fish, the flesh of which is edible (Ward, 1942).

Previous Records of Injury.

The evil reputation of the stone fish dates back to antiquity. Certain tribes of Australian aborigines of north Queensland used a beeswax model of the stone fish and mimicked the effects of a sting during their initiation ceremonies (Roughley, 1954). In this way the youthful members of the tribe were instructed to beware of the dangers of the fish.

Since 1845, when Clarke reported from Mauritius the effects of the sting of what was believed to have been a stone fish, scattered reports on the stone fish and its venom apparatus have appeared in the literature. These have been reviewed by Phisalix (1922) and more extensively by Whitley and Halstead (1955), and by Halstead *et alii* (1956).

Relatively few case histories have been reported in the Australian literature. Duhig and Jones (1928) published in detail the history of one case, and Ralph (1943) reported a case from New Guinea. Brief references to cases of stings were also made by Byrne (1924) and by Whitley and Boardman (1929). The authenticity of previous reports was questioned by Flecker (1956), who believed the dangers of the stone fish to have been exaggerated. He quoted three additional cases, in two of which only trivial symptoms were present. Published reports of case histories of stone-fish stings are scarce

because most stings occur in tropical regions where there is often no one in attendance who is able to report them. There may also be a reluctance to report a case when treatment is only empirical and symptomatic and frequently not very successful. However, those reports that have been published leave little room for doubt that a sting by the stone fish can cause severe ill effects, and although no deaths have been reported authentically from Australia there is strong circumstantial evidence that fatalities have occurred.

Effects of the Sting.

The following account of the effects of stone-fish stings has been published by Smith (1951), who collected the information from natives on the coast of Portuguese East Africa.

> Pain starts almost at once and rapidly becomes intolerable. Within ten to fifteen minutes the victim either collapses or becomes delirious and maniacal, raving and thrashing about in a boat or on the ground.

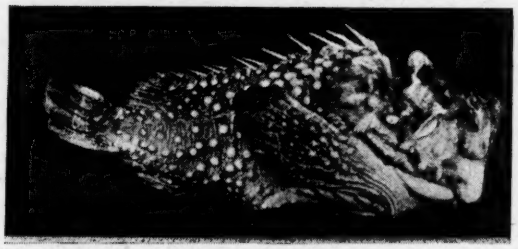

FIGURE I.

Stone fish (*S. trachynis*) showing 13 exposed dorsal and three anal spines.

> If stabbed whilst wading, it generally takes three or four men to hold him and get him to shore without drowning. The intense agony lasts from 8 to 12 hours, after which it gradually diminishes, but the victim is weak and exhausted.
>
> Those who die generally do so within a time assessed at about six hours. Swelling starts soon after the stab and continues to increase for "some days". Legs may attain elephantine proportions. Some victims are able to walk after 3 weeks, but mostly it is said to be "a long time" before the limb is usable. Often large blisters form and sloughing of large areas of skin occurs. Sometimes the dark pigment is destroyed and the skin of the blistered area remains light pink. Stabs in fingers and toes have led to the loss of those digits which turn black and "fall off". Some persons are still "sick" as long as a year afterwards.

The excruciating pain dominates the clinical picture in the early stages. In a case quoted by Ralph (1945) the patient was "screaming and half mad with agony", which was not relieved by morphine. Similarly, Smith (1951), who described in detail his own experience of a sting, stated that he had "an insane desire to ease the mounting agony by rolling on the ground" and that morphine, one-third grain, did not ease the pain.

In addition to the severe pain, the injured part loses sensation, becomes paralysed and may swell rapidly, due to the effusion of fluid into tissue spaces. This fluid and the impaired circulation of the limb from pressure exerted by it provide favourable conditions for the multiplication and spread of bacteria. Abscess formation, necrosis and gangrene are common complications which may delay convalescence and impair the function of the affected limb. In one case cellulitis lasted for six weeks after the sting (Byrne, 1924). In another case the skin and subcutaneous tissue of the foot and leg "formed but the outer wall of a bag of pus" (Duhig and Jones, 1928). In the case of Smith (1951), whose injury was complicated by severe infection, the site of injury "opened to a discharging cavity and did not finally heal until 50 days after the stab".

In addition to its peripheral effect, stone-fish venom also has a central action causing paralysis and affecting respiration. This is best demonstrated in laboratory animals. The injection of lethal amounts of venom in mice produced total paralysis, pulmonary hæmorrhage and œdema, coma, irregular respiration and death from respiratory failure. Similarly, Gail and Rageau (1956) observed that after the injection of stone-fish venom into a rat and a dog death was due to the inhibition of respiration. This central action of stone-fish venom is further illustrated in the following case.

Report of a Case.

The victim, a woman aged 33 years, was walking on the reef near Troughton Island, Western Australia, in May, 1957, followed by her husband, who killed the stone fish and supplied the following information in August, 1957.

Mrs. A. trod on a stone fish at 5.45 p.m., receiving a skin wound on the side of the great toe on the right foot. In less than a minute pain was felt. This pain rapidly increased in severity. By 5.55 p.m. the foot was numb with pain, and the leg from ankle to knee was becoming paralysed.

During this period she was walking through about six inches of sea water covering the reef. Shoes were worn by her, but the right shoe had a small hole sufficient in size to allow one "spine" to penetrate the skin.

Mrs. A. was put to bed about 6 p.m. and was treated as for shock. Warm sweetened tea was given, but no food. Two "Angesil" tablets were taken to relieve headache and pain, pending the receipt of medical advice. The pain grew steadily worse. At about 8 p.m. advice was received to give phenobarbitone tablets, and this was done. Between 8 p.m. and 10 p.m. it was evident that Mrs. A.'s vision was not normal and her eyes were bloodshot and glazed in appearance. There was some impairment to her hearing, but it was difficult to be certain about this because there were periods when she was not wholly conscious. Between 10 p.m. and midnight, when her condition appeared to improve for about 20 minutes, she commented about the taste in her mouth. Extreme giddiness and nausea without vomiting occurred between 6.15 p.m. and midnight.

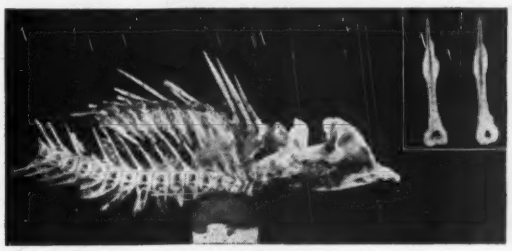

FIGURE II.

Skeleton of stone fish (tail-end missing). Insert shows two isolated spines with attached venom glands.

Mrs. A. appeared to be resting between 1 a.m. and 2 a.m. the next day, but she became restless, and although the heart appeared to be beating strongly she was having some difficulty in breathing properly and became delirious. About 3 a.m. a crisis was reached and it seemed that she was nearing death. Her cheeks were losing colour and becoming grey in appearance. Her eyes were dull and almost lifeless and she was apparently wavering between consciousness and unconsciousness. She did not feel her husband's touch and could not communicate in any way at all. This period lasted about 20 minutes and then seemed to pass until just after 4 a.m., when the same symptoms of crisis were again evident, but, as before, Mrs. A. seemed to recover and then rest for about an hour. Between 6 a.m. and 8 a.m. she vomited two or three times, but was later able to drink warm tea and appeared to have passed the dangerous stage.

The nausea and pain continued for the next 24 hours and then she slowly recovered, but was quite weak for seven days and remained in bed at rest for that time. Pethidine was given on the Saturday to relieve the pain.

For the following month Mrs. A. became short of breath and tired easily, and at the present time still suffers slightly from these after-effects.

Prognosis.

The occurrence of trivial injuries in some cases of stings in no way diminishes the potential danger of the stone fish. As in the case of bites and stings by other venomous animals, a number of variable factors operate at the time of the injury and affect the amount of toxic material introduced and its effect on the body. In the case of the stone fish it has been shown (Duhig and Jones, 1928) that the venom sacs are not uniformly well developed and that in some cases no sacs may be present on individual spines. A sting by one of these spines would produce only minor symptoms. Similarly, whether or not infection will occur in an individual case is not predictable, but it appears to be a frequent complication. Generally, the greater the number of spines that have penetrated the skin, the more severe are the effects likely to be. It has been suggested that stings in the foot are more dangerous than those of the hand, because of the pressure exerted on the venom glands by the weight of the body (Evans, 1943). In these cases penetration of the spine may also be deeper and effective first-aid treatment more difficult to apply.

Amongst 25 cases of stone-fish stings collected by Bottard (1889) there were seven deaths. The times of death are variously reported to have been from a few hours to several months after a sting. With regard to these, Phisalix (1922) believed that unless death occurred "quickly" it must be considered to have resulted from infection rather than from the action of the venom.

From the scanty records that are available, it appears that the degree of pain is an index of the severity of a sting. When pain is absent, no further symptoms usually develop. If, after a severe sting, the victim survives for 24 hours, death is not likely to occur afterwards unless caused by infection which has not been controlled by treatment.

Treatment of Stings.

Although in practice the relief of pain is the most urgent problem requiring attention, it is the central action of the venom which endangers the life of the patient. The object of treatment is to delay the absorption of venom, to relieve pain, to assist in the destruction of venom and to combat infection. Gail and Rageau (1956) state that the multiplicity of treatments which have been proposed for the treatment of stings by venomous fish suggest that no treatment is really specific. Until an effective antivenene becomes available, treatment must remain empirical and symptomatic. For the treatment of stone-fish stings, the following measures deserve consideration, as they have proved their usefulness in practice.

Tourniquet.

The application of a tourniquet is indicated for two reasons: it delays absorption of venom into the circulation, and by keeping venom localized it facilitates the destruction of venom by chemical agents.

Evans (1943) recommends the immediate application of a ligature followed by the local infiltration of potassium permanganate. Smith (1951), who applied a ligature almost immediately and followed it by incising and sucking the wound, felt the pain spreading and increasing in severity within a few minutes after a sting. Although he was stung by two spines and suffered severe local effects, the central action of the venom was minimal in his case. By contrast, in the case of Mrs. A., in which no tourniquet was applied, the central action of the venom predominated and first manifested itself with a disturbance of vision two to four hours after the sting. These two cases may not be strictly comparable, because Smith also used other measures which may have destroyed the venom. However, existing evidence favours the use of a tourniquet.

It is not known whether venom can spread along nerves. The severe pain is largely confined to the involved limb and spreads proximally from the site of injury. The application of a tourniquet will not prevent the occurrence of pain. In fact, by localizing the venom, a tourniquet may even intensify the pain. However, as pain can be abolished by means of chemicals, and since it is the central action of venom which endangers life, any measure designed to delay the absorption of venom is proper treatment.

If a tourniquet has been applied immediately after a sting, scrubbing of the puncture with water followed by incision and suction may help to remove a small amount of venom. The enlargement of the wound will also assist drainage should infection occur. To be effective a tourniquet should be applied immediately or not later than a few minutes after the sting.

Emetine Hydrochloride.

The following information has been supplied by Dr. W. Armstrong in 1957 from Lenakel, New Hebrides, regarding the treatment of stone-fish stings.

> This fish infests the reefs of this island and occasionally we would get a patient who had trodden on, or been punctured in the hand by, one of these fish. In many cases the fish was caught. In others, I had only the patient's word, and it is possible that other fish had been the cause.
>
> However, in all cases without exception the patient was obviously in great agony. In the first years of my stay here I tried many lines of treatment without much success as far as immediate relief was concerned. Then I tried and used in several cases an infiltration of novocaine at the site of puncture. This was better but still not as good as one would wish. Then I saw a small paragraph, which I have never been able to rediscover, in some journal that came my way, recommending an infiltration of emetine.
>
> This I did with all further cases, using the usual ampoule of 1 gr. in 1 c.c. which we all have on our shelves for use in amœbic dysentery. The results were dramatic. I have never in thirty years of practice seen anything so sensational in the way of relief. Even the Amyl nitrite relief of angina was nothing to it. In every case without exception the relief was complete and permanent before I had completed the infiltration. The look of sheer amazement that spread over the patient's face as the pain subsided was something one will never forget.

Emetine hydrochloride was also used successfully in over 30 cases of scorpion stings in which it relieved pain permanently whilst local analgesics provided only temporary relief (Holmes, 1957). Similarly, in the case of a sting by the dorsal spine of a bullrout (*Notesthes robusta*) the local infiltration of emetine produced relief from pain within three minutes (Short, 1957).

In our experiments emetine appeared to neutralize the toxic action of stone-fish venom. It protected mice against one lethal dose of venom if the two substances were mixed before being injected intravenously. Sublethal doses of stone-fish venom also protected mice against a lethal dose of emetine. This mutually antagonistic action of emetine and stone-fish venom deserves further study. In addition to its action on venom, emetine also has a temporary and localized anæsthetic effect when injected intradermally into man. Erythema and induration may remain present for several days after the injection.

Potassium Permanganate.

For the treatment of stings by venomous fish, Evans (1921, 1943) recommended the infiltration into the wound of a few minims of a 5% solution of potassium permangate. He stated that "the relief from the acute agony if treated in this way is almost instantaneous and the pain disappears as if by magic". The local infiltration of potassium permanganate has also been used with "dramatic results" for the relief of pain in two patients stung by a bullrout (Short, 1957). The bactericidal action of potassium permanganate, brief as it is in the presence of tissue fluid, may also destroy bacteria introduced with the sting. Because of its caustic action, too much potassium permanganate may cause necrosis of tissue, but this complication of its use was not mentioned by Evans (1921, 1943), who injected a few minims, nor did it occur when injected in the two cases of bullrout stings (Short, 1957).

Both emetine and potassium permanganate appear not only to relieve pain, but also to prevent the occurrence of other and more serious manifestations of intoxication. In so far as these are not due to the severe pain it suggests that even *in vivo* these chemicals act by destroying the venom. However, some blocking effect on nerve endings cannot be excluded in view of the evanescent relief of pain obtained when local analgesics were used.

It is not certain how long after the injury chemical treatment will afford relief. In the case of scorpion stings it was used successfully two to three hours after the sting (Holmes, 1957). Whatever the interval may have been in the case of stone-fish stings, it was long enough for those who used chemical treatment to apply it effectively in practice whenever the patient was first seen and to rely on it as the main therapeutic measure.

Heat.

In the case of a stone-fish sting, after both morphine (one-third grain) and "Novocain" had failed to relieve pain, "immersion of the affected limb in hot water produced a dramatic effect in reducing the pain to bearable proportions" three and a half hours after the sting (Smith, 1951). In another case of a sting in the foot, immersion of the foot in hot water only slightly eased the pain (Duhig and Jones, 1928). Evans (1921) recorded that for the treatment of venomous fish stings fishermen plunge the part in boiling vinegar or hold it over the funnel of a boiler.

We have observed that stone-fish venom is heat labile. It was coagulated and destroyed by boiling, whilst at a temperature of 52° C. it lost its toxicity in less than 30 minutes. The effect of heat suggests that stone-fish venom is of the nature of an albumin. This is supported by our observation that stone-fish venom was a good antigen and readily stimulated the production of neutralizing antibodies in a rabbit.

In the absence of medical attention the use of hot water is a useful and simple therapeutic measure. To be effective the whole extremity must be immersed continuously and the temperature of the water should be as hot as can be borne by the uninjured opposite limb of the patient or by an attendant. As the injured limb frequently has lost all sensation, care is required to prevent burns.

Antibiotics.

Injection of penicillin was used successfully to limit the spread of infection on the sixth day after a sting, and again on the thirteenth day when inflammation recurred (Smith, 1951). Because infection is a frequent complication in severe cases of stings, the prophylactic administration of antibiotics is indicated for the first few days, or longer if necessary. In these cases prophylaxis against tetanus is also required. The possibility that tetanus complicated one case of stone-fish sting (Duhig and Jones, 1928) cannot be excluded.

If any part of the spine of the fish has remained embedded in the tissues it must be removed.

Other Measures.

Stimulants may have to be administered for the treatment of shock. Because of its depressing effect on the respiratory centre and its failure to relieve pain, the use of morphine is contraindicated. There is no evidence that antihistamines are of any value. ACTH and cortisone may limit the exudation and swelling and, if used, should be supplemented with antibiotics.

Natives of all localities where stone fish occur have their own local remedies, which are mainly derived from plants. Evans (1943) mentions the use of *Abrus precatorius* by the natives of Mauritius. Other plants are listed by Gail and Rageau (1956). The Australian aborigines of north Queensland used the sap of the milky mangrove. "They break a little branch or limb of the milky mangrove and put the sap on the wound and the pain is gone" (Jarrett, 1957).

Conclusions and Summary.

Both local and general effects may follow the sting of a stone fish. The local effects are pain, swelling, paralysis and loss of sensation of the injured limb. The general effects include repeated syncope, impairment of all sensations, involvement of respiration and coma. Abscess formation, necrosis and gangrene not uncommonly complicate the local effects of a sting and delay convalescence. Dyspnœa and general weakness may last for several months after a sting.

The following therapeutic measures are recommended.

1. Immediate application of a tourniquet followed by scrubbing of the wound with water, incision and suction.

2. Injection along the track of each puncture of 0·5 to 1·0 millilitre of a solution of one grain of emetine hydrochloride per millilitre. Alternatively, and when the use of emetine is contraindicated, 0·1 to 0·5 millilitre of a 5% solution of potassium permanganate may be used.

3. In the absence of anyone able to inject these drugs, relief from pain may be obtained by immersion of the injured limb in hot water, care being taken not to burn the patient.

4. Prophylactic injections of penicillin and immunization against tetanus are required in severe cases of injury.

5. Foreign bodies embedded in the wound require removal, and the wound should be left open to permit drainage.

Acknowledgement.

I am grateful to Dr. R. Endean for the supply of stone-fish venom.

References.

BOTTARD, A. (1889), quoted in Phisalix, M. (1922), *loco citato*: 527.

BYRNE, K. (1924), "Injuries in Australia Attributable to Animals", M. J. AUSTRALIA, 2: 539.

CLARKE, V. C. (1845), "Poisoning by Fish", *Med. Times*, 12: 182.

DUHIG, J. V., and JONES, G. (1928), "The Venom Apparatus of the Stone Fish (Synanceja Horrida)", *Mem. Queensland Museum*, 9: 136.

EVANS, H. M. (1921), "The Poison Organs and Venoms of Venomous Fish", *Brit. M. J.*, 2: 690.

EVANS, H. M. (1943), "Sting-Fish and Seafarer", Faber & Faber, London.

FLECKER, H. (1956), "Injuries from Stone Fish", M. J. AUSTRALIA, 2: 371.

GAIL, R., and RAGEAU, J. (1956), *"Premières observations sur un poisson marin venimeux de la Nouvelle-Caledonie: La Synancée (Synanceia verrucosa, Bloch)"*, *Bull. Soc. path. exot.*, 49: 846.

HALSTEAD, B. W., CHITWOOD, M. J., and MODGLIN, F. R. (1956), "Stonefish Stings and the Venom Apparatus of Synanceja Horrida (Lin.)", *Tr. Am. Microscop. Soc.*, 75: 381.

HOLMES, M. MCA. (1957), "Scorpion Bites", *Brit. M. J.*, 2: 353.

JARRETT, W. S. (1957), personal communication of information supplied by G. Bowen, an old aboriginal of north Queensland.

PHISALIX, M. (1922), *"Animaux venimeux et venins"*, Volume I, Masson et Cie, Paris.

RALPH, C. C. (1943), "Poison of the Stone-Fish", *Victorian Naturalist*, 60: 77.

ROUGHLEY, T. C. (1954), "Wonders of the Great Barrier Reef", Angus & Robertson, Sydney.

SHORT, D. W. (1957), personal communication.

SMITH, J. L. B. (1951), "A Case of Poisoning by the Stone-Fish, Synanceja Verrucosa", *Copeia*, 3: 207.

WARD, M. (1942), "Primitive Man and his Larder", *Australian Museum Magazine*, 8: 52.

WHITLEY, G. P. (1943), "Poisonous and Harmful Fishes", Commonwealth Scientific and Industrial Research Bulletin, Number 159.

WHITLEY, G. P., and BOARDMAN, W. (1929), "Quaint Creatures of a Coral Isle", *Australian Museum Magazine*, 3: 366.

WHITLEY, G. P., and HALSTEAD, B. W. (1955), "An Annotated Bibliography of Poisonous and Venomous Fishes of Australia", *Records of the Australian Museum*, 23: 211.

Addendum.

Since writing the foregoing, Dr. I. S. Reid, of Tanna, New Hebrides, has supplied information which further

confirms the effectiveness of emetine hydrochloride for the treatment of stone-fish stings.

A native girl, aged 10 years, was wading in shallow water when she trod on a stone fish and was stung in the soles of both feet. Immediate sharp pain was felt, which increased in severity. The feet began to swell and assumed a blue colour. When seen one hour after the injury:

> The girl was in tears with obviously intense pain. Both feet were swollen and the swelling had extended to the right leg as well. On the sole of the right foot were two small puncture wounds which did not penetrate beyond 5 mm. They were surrounded by bruising and purplish coloration which extended over an area of about 4 cm., and then gave way to red streaks which extended to the lower leg. On the sole of the left foot a similar appearance was seen, but not so extensive—only one puncture mark being seen.
>
> I had nearby some ampoules of emetine hydrochloride and injected about 1 grain along the track of each of the puncture wounds. The relief was instantaneous and dramatic. The girl relaxed and in place of her tears came a great smile of relief over her face. The girl's sister who had come to the patient's aid had also stood on the stone-fish, but had only one puncture. However, her pain was also severe, and I injected emetine into the puncture wound with the same satisfactory result.
>
> The legs were then bandaged up with pressure bandages and the girls kept in hospital for four days. One was given penicillin for yaws, but no further treatment was given and the legs did not appear to give any further pain. The swelling had subsided when they walked home five days after the injury.

On further inquiry from Dr. Armstrong, it was learned that no tourniquet was used in any of his cases, that the time interval between the sting and the injection of emetine ranged from fifteen minutes to two hours, and that in all cases relief from pain was virtually instantaneous.

With regard to the incidence of infection, Dr. Armstrong wrote:

> No infections were ever noticed. In fact, the only such result of a stone-fish sting that I have seen was some thirty years ago when a patient arrived from 15 miles away a few days after the sting. By that time the terminal phalanx of the great toe (the sting had been in the pad of that phalanx) was in a typical state of dry gangrene, black, hard and with a line of demarcation developing between the healthy and the unhealthy tissues. A day or two later when the line was well defined I amputated the toe.

SOLAR LIPSTICK: A PROTECTIVE DEVICE.

By KEITH S. MOWATT, L.R.C.P. (Edin.), M.B., Ch.B. (Edin.), D.M.R.T. (Edin.), M.C.R.A., F.F.R.,
Deputy Director, Queensland Radium Institute,

AND

D. F. ROBERTSON, M.Sc., A.Inst.P.,
Senior Physicist, Department of Radiation Physics, University of Queensland.

SUN EXPOSURE in Queensland, as in many other of the Australian States, is a major problem, causing many skin lesions in those who follow outdoor occupations. This is reflected in the large number of cutaneous malignancies and keratoses of the face and lips. The Queensland Radium Institute treats more than 200 cases of carcinoma of the lip per annum, quite apart from keratotic lesions and other pre-malignant changes in the lip mucosa. This may give some indication of the extent of the problem as it exists in Queensland. As carcinoma of the lip carries with it a very serious prognosis, anything which will offset this by diminishing sun exposure is very welcome indeed.

As a first step, patients who had scarred lips or atrophic lips were advised to use varying types of applications. Lanolin, "Ungvita" or zinc oxide ointment were all tried. However, these were found in practice to be ineffectual. A wharf labourer, for instance, could not be persuaded to carry ointment with him to his work and apply it there. Unless a form of protection was constantly applied to the lip throughout the day, the beneficial effect was vitiated.

The next step was to persuade such patients to utilize a colourless lipstick, and it was found that more working men could be induced to do this consistently than had previously been the case with the ointments.

Having adopted such a procedure, thought was then given to improving such applications, and a lipstick was devised containing 5% salol. The salol acts as a specific filter for the wave-lengths of sunlight just below 3200 Ångström units, which seem to be the troublesome ones as far as erythrogenic and carcinogenic effects are concerned. We have found clinically that the use of these lipsticks, in more than a thousand cases, has made a tremendous improvement to the condition of the patients' lips. This has proved of great value prophylactically for those patients who are exposed to excessive sunshine as a result of their occupation, and also for such patients as have had their lips treated by radiotherapy or cautery and thereafter have poor tolerance of the mucosa. The ultra-violet absorption of this material has been measured in the laboratory of the Physics Department of the University of Queensland.

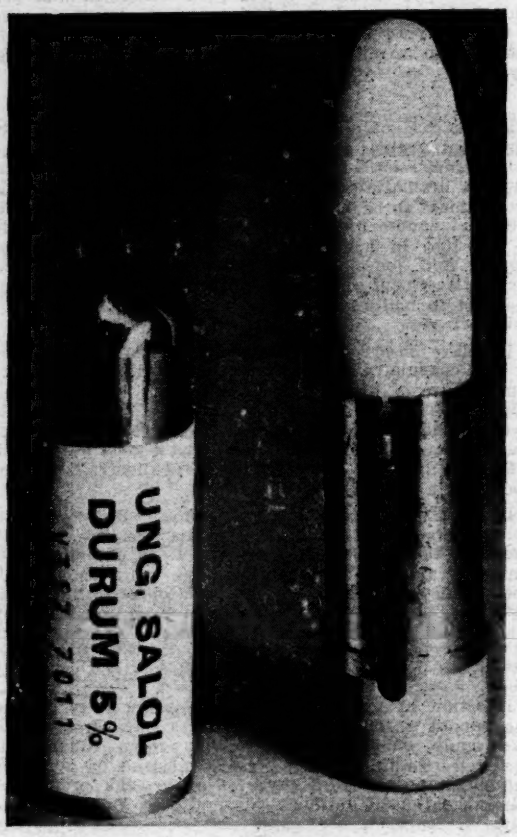

FIGURE I: The lipstick.

Sunburn and skin cancer are both caused by wave-lengths less than 3200 Ångström units in the sun's radiation (Blum, 1940). To measure the ability of any exposure to induce skin cancer or erythema or to assess the useful absorption in any protective cream, it is necessary to measure only wave-lengths between 2900 and 3200 Ångström units. This is done successfully with an ultra-violet-fluorescence meter constructed by the University Cancer Research Fund following principles first described

by Scott (1949). A filter of Corning 9863 glass absorbs the intense visible sunlight, but allows all the ultra-violet light to fall on a thin layer of magnesium tungstate which is excited by wave-lengths less than 3200 Ångström units to give a visible fluorescence. This is registered by a selenium photocell with a narrow-band green filter, the current from which has been shown to be fairly nearly proportional to the erythemal effectiveness of the radiation falling on the whole unit.

The absorption of thin layers of various protective mixtures has been measured on this erythemal-ultra-violet meter. Layers of uniform and measurable thickness were obtained by placing the absorber between two sheets of clear Corning 9700 glass which transmits wave-lengths to below 2800 Ångström units. These layers were clear to visible light, so that the absorption recorded was true absorption not confused by scattering.

TABLE I.

Percentage Transmission of Erythemal Ultra-Violet Light.

Absorber.	Thickness (Millimetres).		
	0·1.	0·05.	0·01 to 0·02.
Yellow petroleum jelly	3	4	18
10% salol in petroleum jelly	3	3	8
5% salol lipstick (D.H.A.)	8	9	12
Salol protective cream (Queensland Radium Institute formula)	3	4	7
Salol protective cream with tannic acid (Queensland Radium Institute formula)	2	2	3

Table I compares the percentage transmission measured for selected sunburn preventatives and shows their relative value when applied before exposure to the sun. If nothing better is available, plain petroleum jelly is valuable in an emergency. For the salol mixtures, only a thin smear is necessary, but care is required to ensure that all highly exposed surfaces are completely covered.

Summary.

The use of a lipstick embodying an ultra-violet filter is described. This has proved very effective clinically in treating patients. Some physical measurements of the relative absorption of ultra-violet radiations are also described.

Acknowledgements.

The authors wish to express their appreciation of the cooperation of the Director of the Queensland Radium Institute and Professor H. C. Webster, Department of Physics, Queensland University.

References.

BLUM, H. F. (1940), "Sunlight and Cancer of the Skin", *J. Nat. Cancer Inst.*, 1: 397.

SCOTT, H. S. (1949), "Measurement of Erythemal Energy", *Trans. Am. Inst. Elect. Eng.*, 68, 725.

A LABORATORY STUDY OF LARYNGO-TRACHEO-BRONCHITIS IN CHILDREN IN MELBOURNE (1956).

By DORIS M. GRAHAM,

Department of Pathology, Sporting Globe–3DB Virus Diagnostic Unit, Royal Children's Hospital, Melbourne.

FIFTY-EIGHT PATIENTS with laryngo-tracheo-bronchitis admitted to this hospital during 1956 have been studied. Many patients with upper respiratory tract infections who are hospitalized each year do not yield pathogenic bacteria, and it was hoped that a study of the viral flora associated with these cases would help determine the principal agent involved. Since Rowe *et alii* (1953) described degenerative changes developing in cultures of adenoid tissue and isolated the cytopathogenic agents involved, a new group of viruses known as adenoviruses, has become known (Enders *et alii*, 1956). Beale *et alii* (1956) reported the isolation of several similar agents from tracheotomy material from patients with acute laryngo-tracheo-bronchitis, but their identification was not established. Thus the possible association of this group of viruses in these cases was of particular interest.

Before his admission to the infectious ward, each patient was examined by two senior members of the medical staff in order to obtain uniformity of selection of the patients chosen for study.

Collection of Specimens.

Within twenty-four hours of admission to hospital a throat swab and sterile blood sample were taken from each patient. The throat swab was put immediately into two millilitres of Hanks's balanced salt solution (Hanks and Wallace, 1949), containing 1% gelatin, and sent to the virus laboratory in this form (henceforth this fluid will be referred to as "throat washing"). The serum and throat washing were stored at −10° C. until required. A convalescent blood sample was requested 10 days after the first sample had been taken, but this was obtained from only half of the patients.

Experimental Procedures.

Isolation of Virus.

Three methods were used in an attempt to isolate viruses from throat washings, using eggs, cultures of HeLa cells and monkey kidney cultures.

1. Twelve day-old developing chick embryos were inoculated amniotically and incubated at 35° C. for a further two and three days, when both amniotic and allantoic fluids were sampled. Fowl red blood cells and human group O red cells were added to both these fluids, allowed to settle at 4° C. for 30 minutes and the results of the tests read for hæmagglutination. Two blind passages of amniotic fluid were performed after the initial inoculation before a sample was discarded as "negative". Forty-four throat washings were examined in this way, but no influenza virus was isolated.

2. Fifty-six throat washings were inoculated into stationary cultures of the HeLa strain of human carcinoma cells (Gey *et alii*, 1952), maintained by the general trypsinization technique of Scherer, Syverton and Gey (1953)[1]. The cultures were examined every two days. After eight to 10 days the cultures were quickly frozen and thawed three to six times and transferred into a fresh culture of HeLa cells. If there were no signs of infection in the third passage the specimen was classed as negative. Only one throat washing yielded a cytopathogenic agent, and this could be passed readily in cultures of both HeLa and monkey kidney cells. This agent produced densely granular, round cells, extensive clumping, acid formation and dislodgment of cells from the walls of the tube, its behaviour resembling that described by Huebner *et alii* (1954) for adenoviruses in every respect. In cultures of both HeLa and monkey kidney cells this agent yielded the complement fixing antigen of adenoviruses, as identified with known "positive" and "negative" sera. Its infectivity for monkey kidney cells was neutralized by type 2 adenovirus antisera, but not by type 3 or type 7 antisera.[2] With

[1] Scherer's technique was modified as follows. All media contained penicillin, 100 units, and streptomycin 50 microgrammes per millilitre. The medium used to grow HeLa cells in bottles consisted of 40% pooled human serum, 0·25% lactalbumin hydrolysate and 59·75% Hanks's balanced salt solution. After trypsinization cells were suspended in a medium of 35% calf serum, 0·25% lactalbumin hydrolysate and 64·75% Hanks's balanced salt solution, and were grown for four to six days in tubes, then replaced with maintenance solution of 10% calf serum, 0·25% lactalbumin hydrolysate and 89·75% Hanks's balanced salt solution after inoculation. Some round cells were formed using calf serum, but this did not prevent viral degeneration being detected. Calves under three months of age were used.

[2] Standard adenoviruses types 2, 3 and 7 were supplied by Dr. R. J. Huebner, National Institute of Allergy and Infectious Diseases, Maryland, U.S.A. Specific rabbit serum against each type was prepared using the technique of Rowe *et alii* (1955).

TABLE I.

Serology Titres in Paired Sera in which Influenza or Adenovirus Antibodies were Detected.

Patient.	Month of Admission to Hospital.	Days Between Collection of Serum Samples.	Complement Fixation.				Adenovirus Neutralization Titres.					
			Influenza A.		Adenovirus.		Type 2.		Type 3.		Type 7.	
A	May.	14	—	—	16	12	36	36	36	15	—	—
B	May.	27	—	—	128	64	—	—	—	—	—	—
C	May.	16	—	—	24	20	—	—	—	—	—	—
D	May.	8	—	—	32	24	36	36	—	—	—	—
E	May.	16	—	—	16	16	—	—	—	—	—	—
F	June.	16	—	—	32	24	—	—	180	115	—	—
G[1]	June.	13	—	—	16	42	15	60	N.S.S.[2]		N.S.S.	
H	June.	18	—	—	4	—	36	20	36	36	—	—
J	June.	10	—	20	N.S.S.	24	N.S.S.		N.S.S.		N.S.S.	
K	July.	9	—	—	16	20	115	36	36	36	—	—
L	July.	13	—	—	8	8	36	36	—	—	—	—
M	July.	6	—	—	64	64	15	15	—	—	36	36
N	July.	12	—	—	8	12	—	—	—	—	—	—
O	July.	62	—	—	4	32	20	60	—	—	—	—
P	July.	15	—	—	24	24	36	36	—	—	—	—
Q	August.	10	—	—	64	64	36	36	36	36	—	—
R	August.	9	—	—	128	96	36	20	—	—	—	—
S	August.	10	6	8	32	24	60	115	—	—	—	—
T	August.	10	24	14	Anti-complementary	—	—	—	—	—	—	—
U	September.	9	—	—	8	8	36	36	—	—	—	—

[1] Adenovirus type 2 was isolated from the serum of patient G.

[2] "N.S.S."=not sufficient serum available for test to be carried out. All titres are expressed as the reciprocal of the dilution giving the 50% end point in the specific test. The two figures in each of the serology columns are the titres of the first and second serum samples respectively.

this antigen, sera from patient G showed a twofold rise by the complement fixation technique and a fourfold rise in the neutralization test. The convalescent serum was obtained 13 days after the sample taken in the acute stage, and as, according to Hilleman and Werner (1954), adenovirus complement fixing antibodies reach a maximum after about 14 days, and neutralizing antibodies 21 to 24 days after the onset of symptoms, these increases may not yet have been at their maximum. On this evidence the isolated virus was classified as being type 2 adenovirus and the presumptive pathogen of patient G. at the time of his admission to this hospital. This throat washing was stored at −10° C. for four months before inoculation.

3. Forty-two throat washings were inoculated into monkey kidney cells, but from none was any cytopathogenic agent obtained. Twenty of these were passed once in stationary cultures and kept for eight to 12 days. The rest were passed at least twice, each in roller tubes, with three to six cycles of quick freezing and thawing between passages. Still no cytopathogenic changes were found in these. The specimen yielding type 2 adenovirus in HeLa cells had one passage in a stationary culture of monkey kidney cells. No virus was obtained from this culture. It is of interest that a similar throat washing obtained in 1957 yielded type 2 adenovirus by the sixth day in rolled monkey kidney cells and in later passages lesions appeared earlier.

Isolation of Pathogenic Bacteria.

Fifty-five throat washings were examined in the bacteriology laboratory for the presence of pathogenic bacteria. Fifteen isolations of *Staphylococcus aureus*, five isolations of β-hæmolytic streptococci, one isolation of *Streptococcus pneumoniæ* and one isolation of *Hæmophilus influenzæ* (not type *b*) were made. Phage typing of the staphylococci showed only three of the 15 isolations to be type 80-81, which has been the main staphylococcal type associated with fatal cases of pneumonia in this hospital during 1955-1956. The patient G., from whom adenovirus type 2 was isolated, yielded also a scant growth of β-hæmolytic streptococci. These results did not further elucidate the ætiological role of any single organism in these cases.

Serological Investigations.

Sera were tested for agglutination with "Q" fever antigen and washed sheep cells (Paul Bunnell test) and for cold agglutinins. No positive reaction was obtained. Complement fixation titrations using heated phenolized psittacosis, chloroform purified influenza A and B and heated adenovirus antigens were performed. No significant titres were obtained using psittacosis antigen, and only one patient, J., showed a rise in influenza A complement fixing titre. This rise from negative (less than four) to 20 over a period of 10 days was indicative of current infection. Two other patients with paired sera (S. and T.) gave evidence of prior influenza A infection, showing titres of 24 and 14, and six and eight over ten-day and nine-day periods respectively. No evidence of influenza B infection was found. The positive results given by paired sera are shown in Table I.

Using heated monkey kidney tissue culture fluid infected with type 2 adenovirus as group antigen (Rowe *et alii*, 1955), sera from 52 patients were titrated in the standard complement fixation test. Sera from 29 patients (56%) showed titres greater than or equal to eight, and two showed a titre of four. For children of this age range a positive complement fixation titre as low as four is probably specific, and we recognized an increase greater than fourfold as indicative of current infection, providing the two samples of serum were taken within 21 or 28 days of each other. Of the positives 18 were paired sera and 14 pairs showed titres greater than eight, but there was no significant increase or decrease between the two serum samples. One patient, B., showed a twofold decrease in titre over a twenty-eight day period; one (G., from whom type 2 adenovirus was recovered) showed a slightly more than twofold increase in titre over a thirteen-day period, and one patient, O., showed an eightfold increase over a two-month period. This latter response may have been due to an infection later than the laryngo-tracheo-bronchitis for which the patient was hospitalized. Figure I shows the monthly totals of these results.

The 18 pairs of sera in which group adenovirus antibodies had been detected in the complement fixing test were then titrated for strain specific neutralizing antibodies using the only three strains of adenovirus which were available. Thirteen pairs of sera showed neutralizing antibodies at a titre greater than 10 (positive) against type 2 (four of these also showed positive titres against type 3 and one against type 7), five pairs showed positive titres against type 3 (four of these also showed type 2 neutralizing antibody as above-mentioned) and one pair showed positive type 7 antibody (and also contained type 2 antibody as above). Serum pairs from two patients showed a rise against type 2 (Table I), patient G. from 15 to 60, and patient O. from 20 to 60. One patient, K., showed a threefold decrease in antibody against type 2, with no change in type 3 neutralizing antibody. Another patient, S., showed high titres in both serum samples with no significant rise between the two, but the titres (60 and 115) must be considered indicative of recent infection.

One patient, H., whose sera showed very low complement fixing titres (four and less than four) showed neutralizing antibody to type 2 of 36 and 20, and to type 3 of 36 and 36 for the first and second serum samples respectively. There was a three-week interval between these two samples. This result, significant of a past infection, is probably indicative of the longer persistence of neutralizing antibodies over complement fixing antibodies, but there are insufficient results in this report to make conclusions possible.

submission of specimens for investigation. It was unfortunate that during October there was a sharp increase in the number of patients admitted to hospital, and yet we studied none of these (Figure I).

No influenza virus was isolated. Rising influenza A complement fixing antibodies were detected in only one case (J.), and it was unfortunate that the acute serum sample was insufficient to be used for adenovirus complement fixation, as the convalescent sample showed a titre of 24. Two other patients showed influenza A antibodies,

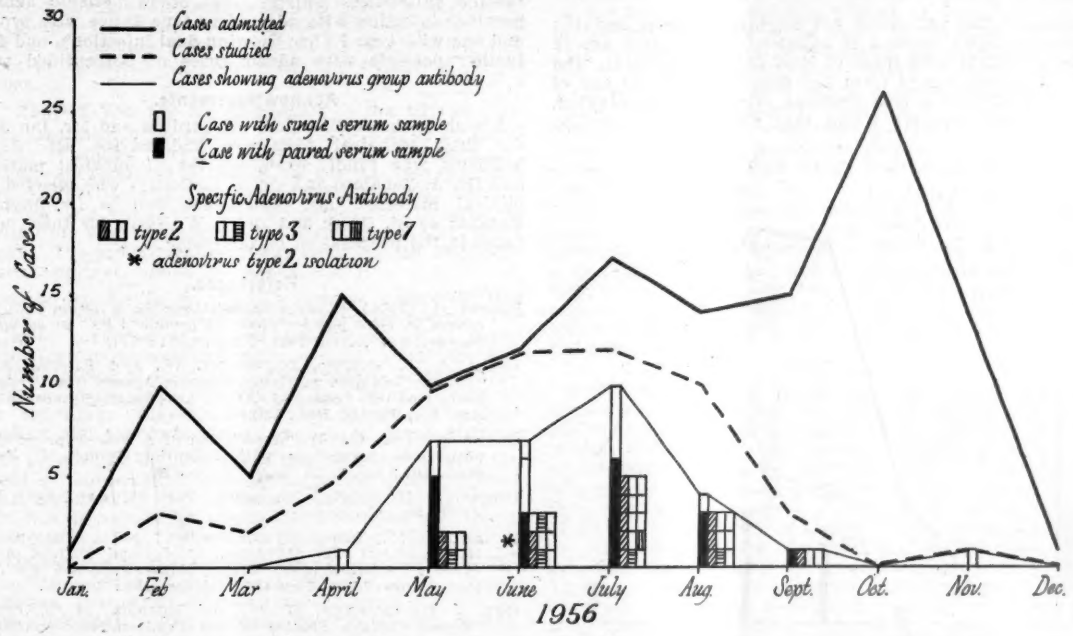

FIGURE I.
Monthly distribution of L.T.B. cases studied, and positive laboratory findings.

Of especial interest was the finding that four patients (B., C., E. and N.) showed high adenovirus complement fixing titres, but no neutralizing antibody to any of our three strains of adenovirus.

TABLE II.
Distribution of Adenovirus Types among Paired Sera from 27 Patients.[1]

Age of Patients.	Number of Patients.	Type 2.	Type 3.	Type 7.
6 to 11 months ..	4	1	0	0
1 to 2 years ..	9	4 (2)	2 (1)	1 (1)
2 to 4 years ..	10	6 (2)	2 (2)	0
4 to 10 years ..	4	2 (1)	1 (1)	0

[1] The figures in parentheses are the number of patients showing dual antibody response.

Discussion.

During the whole of 1956, 139 children were admitted to this hospital with the clinical symptoms of laryngo-tracheo-bronchitis. Their ages ranged from four months to nine and a half years, with 70% of the total cases and 62% of those studied in the age group one to four years (Figure II). Fifty-eight samples were submitted to the virus laboratory for study. It was expected that the largest number of cases would occur between May and September, and strict account was kept during these months of the daily admission of patients to hospital, with subsequent

but with no significant rise: one (S.) showed titres of six and eight, which for a child aged one year is probably significant of past infection; this patient also showed evidence of previous infection with type 2 adenovirus; the other patient, T., showed titres of 24 and 14, with no evidence of adenovirus infection. No evidence was found of the development of antibodies to other antigens used—psittacosis, influenza B, "Q" fever and washed sheep cells in the Paul Bunnell test—in this group of patients, and little significance can be placed on the few isolations of pathogenic bacteria.

The low isolation rate of adenoviruses in this series of cases (from 56 throat washings examined, only one virus was isolated) is of the same order as that obtained by other workers dealing with non-epidemic cases and studying closed communities (Jordan, 1957; Dingle, 1957). Serology results revealed only one other patient with evidence of current adenovirus infection.

Complement fixation tests showed adenovirus antibody in 31 cases. Of these 18 were sets of paired sera, and two only showed rises indicative of current infection (in the patients G. and O.). One patient showed a twofold decrease in titre over a four-week period and this probably indicates adenovirus infection just prior to hospitalization. The persisting level of antibody in each of the other pairs can be attributed to prior infection and is some indication of the prevalence of adenovirus infection in the child community. As shown in Figure II the percentage of cases showing evidence of previous adenovirus infection in children rose from 17% of children between the ages of six and 11 months, to 59% between the ages of one and

two years, to 74% between the ages of two and four years and to 70% of children over the age of four years.

The results of adenovirus neutralization tests performed on paired sera are shown in Table II. In five only of the 18 positive pairs were dual antibody responses detected; four pairs contained antibody to types 2 and 3 (from one patient aged between one and two years, two patients aged between two and four years, and one patient aged between four and 10 years), and one pair showed antibody to types 2 and 7 (from a patient aged one year). These dual responses appear in the column of each antibody they contain.

Although the age spans are slightly different and the number of cases studied is smaller, these figures are in close agreement with those of Huebner *et alii* (1954), who studied in detail sera from 200 persons up to the age of 34 years attending free hospital clinics in Washington, U.S.A. These workers found that already at 11 months

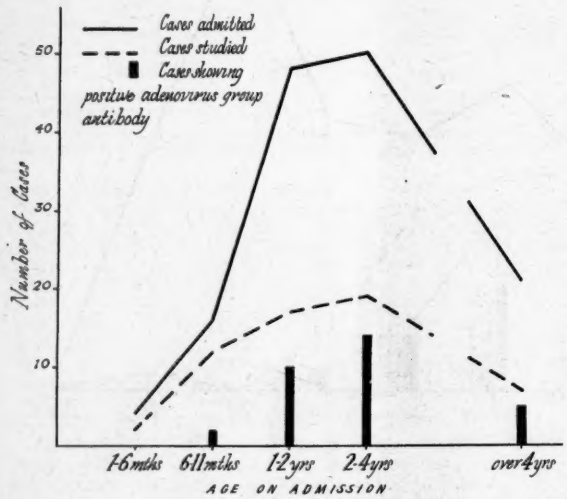

FIGURE II.
Age distribution of L.T.B. cases.

of age over 50% of children had neutralizing antibody to at least one of the adenoviruses type 1 to 6, and about 10% had antibody to three types. Antibody to types 1 and 2 were the most common. The greatest increase occurred in children between the ages of one and two years, and from two to four years.

The "negative" findings in neutralization tests against adenoviruses type 2, 3 and 7 with four pairs of positive complement fixing sera indicate the presence of other strains of adenovirus in this community. Three of these children were admitted to hospital within one week of each other from homes in widely separated suburbs of Melbourne. At least 14 strains of adenovirus have been described in America by Rowe, Hartley and Huebner (1956), and possible new strains have been reported in France by Lepine *et alii* (1956) and by Barski (1956), so this finding, although of interest, was not unexpected. It can thus be concluded that adenoviruses have been present in this child population, possibly in many patients with upper respiratory tract infections, conjunctivitis and pharyngitis not requiring hospitalization; however, they cannot be held entirely responsible for these cases of laryngo-tracheo-bronchitis.

The isolation of cytopathogenic agents from patients with infantile croup (croup associated viruses) by Chanock (1956) increased the known number of agents possibly associated with this clinical disease, but strains of this virus group were not available to be used in this study.

Summary.

Fifty-eight cases of laryngo-tracheo-bronchitis were studied by virological and bacteriological methods. Attempts to isolate influenza virus failed, and serological tests did not show the incidence of influenza, psittacosis, "Q" fever, glandular fever or diseases associated with the development of cold agglutinins. The isolated bacteria were not homogeneous. Adenovirus type 2 was isolated from one throat washng, and 31 patients had antibodies against adenoviruses. Current infection by type 2 adenovirus was revealed in two out of 18 cases by a rise in specific antibodies. Thirteen out of 18 patients showed previous infection with adenovirus type 2, five with type 3, and one with type 7 (five showing dual infection), and four further patients with adenoviruses of unidentified type.

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I wish to thank Miss Joan Richardson and Mr. Ian Jack for their technical assistance and advice, Dr. A. L. Williams who kindly examined the histological material and Dr. A. Venables and Dr. V. L. Collins who selected the clinical material. My thanks are due to Dr. Stephen Fazekas de St. Groth and Dr. J. W. Perry for their assistance in the preparation of this paper.

References.

BARSKI, G. (1956), *"Caractère spécifique de la lésion cellulaire causée in vitro par les virus du groupe A.P.C. et sa valeur diagnostique"*, *Ann. Inst. Pasteur*, 91: 614.

BEALE, A. J., MCLEOD, D., STACKI, W., and RHODES, A. J. (1956), "Isolation of Cytopathogenic Agents from Tracheal Secretions of Cases of Acute Laryngotracheobronchitis", *Am. Soc. Pediat. Res.*, Paper 34.

CHANOCK, R. M. (1956), "Association of a New Type of Cytopathogenic Myxovirus with Infantile Croup", *J. Exper. Med.*, 104: 555.

DINGLE, J. H. (1957), Discussion, Part II, *Ann. New York Acad. Sc.*, 67: 296.

ENDERS, J. F., BELL, J. A., DINGLE, J. H., FRANCIS, T., HILLEMAN, M. R., HUEBNER, R. J., and PAYNE, A. M. (1956), "Adenoviruses: Group Name Proposed for New Respiratory-Tract Viruses", *Science*, 124: 119.

GEY, G. O., COFFMAN, W. D., and KUBICEK, M. T. (1952), "Tissue Culture Studies of the Proliferative Capacity of Cervical Carcinoma and Normal Epithelium", *Cancer Res.*, 12: 264.

HANKS, J. H., and WALLACE, R. E. (1949), "Relation of Oxygen and Temperature in the Preservation of Tissues by Refrigeration", *Proc. Soc. Exper. Biol. & Med.*, 71: 196.

HILLEMAN, M. R., and WERNER, J. H. (1954), "Recovery of New Agents from Patients with Acute Respiratory Illness (2085)", *Proc. Soc. Exper. Biol. & Med.*, 85: 183.

HUEBNER, R. J., ROWE, W. P., WARD, T. G., PARROTT, R. H., and BELL, J. A. (1954), "Adenoidal-Pharyngeal-Conjunctival Agents. A Newly Recognized Group of Common Viruses of the Respiratory System", *New England J. Med.*, 251: 1077.

JORDAN, W. S., JR. (1957), "The Frequency of Infection with Adenoviruses in a Family Study Population", *Ann. New York Acad. Sc.*, 67: 273.

LEPINE, P., CHANY, C., and ROBBE-FOSSAT, F. (1956), *"Étude des virus A.P.C. (Adeno-Virus). 1. Isolement en France de virus du type A.P.C. (Souches P32 et P44)"*, *Ann. Inst. Pasteur*, 91: 607.

ROWE, W. P., HUEBNER, R. J., GILMORE, L. K., PARROTT, R. H., and WARD, T. G. (1953), "Isolation of a Cytopathogenic Agent from Human Adenoids Undergoing Spontaneous Degeneration in Tissue Culture (20714)", *Proc. Soc. Exper. Biol. & Med.*, 84: 750.

ROWE, W. P., HUEBNER, R. J., HARTLEY, J. W., WARD, T. G., and PARROTT, R. H. (1955), "Studies of the Adenoidal-Pharyngeal-Conjunctival (A.P.C.) Group of Viruses", *Am. J. Hyg.*, 61: 197.

ROWE, W. P., HARTLEY, J. W., and HUEBNER, R. J. (1956), "Additional Serotypes of the A.P.C. Virus Group (22231)", *Proc. Soc. Exper. Biol. & Med.*, 91: 260.

SCHERER, W. F., SYVERTON, J. T., and GEY, G. O. (1953), "Studies on the Propagation in Vitro of Poliomyelitis Viruses. IV. Viral Multiplication in a Stable Strain of Human Malignant Epithelial Cells (Strain HeLa) Derived from an Epidermoid Carcinoma of the Cervix", *J. Exper. Med.*, 97: 695.

DIETARY REGIME DURING RADIATION THERAPY FOR CARCINOMA OF THE UTERUS.

By CAROLINE N. TURNER,
Research Dietitian, Peter MacCallum Clinic, Melbourne.

"SIMPLE dietary adjustment can frequently be a valuable adjunct to modern therapeutic methods." This statement may appear trite and commonplace, but it is surprising how often it is overlooked and lost in the intricacies of modern medicine. The purpose of this paper is to describe how dietary adjustment has improved the standard treatment of a common form of cancer by diminishing side effects of radiation and improving the well-being of the patient.

Routine Therapy for Carcinoma of the Uterus.

The treatment of carcinoma of the cervix uteri by radiotherapy is widely used and it is frequently accompanied, and in some instances is limited, by the side effects of this therapy, particularly intestinal inflammation causing diarrhœa and tenesmus. The symptoms can be severely debilitating and distressing and may persist for many months. The complications arising from therapy may even shorten survival (Black and Speer, 1957).

During one month in 1955, 13 patients underwent this treatment at the Peter MacCallum Clinic, Melbourne. The treatment consisted of one or two insertions of intrauterine and/or intravaginal radon sources. Each insertion was for a period of six days. Supplementary X-ray therapy was given to the pelvis, the central dose being reduced by lead shielding. Eleven of the 13 patients developed diarrhœa and tenesmus severe enough to cause distress.

The practice in the hospital at that time was to give the patient a "non-residual" diet (clear liquids, jellies, refined cereals and sugars) for the five or six days during which radon was present in the uterus and/or vagina, so that its position would not be disturbed by bowel movements.

After the radon was removed the patient was given an enema, commenced a "full" ward diet and X-ray therapy was begun. Frequently diarrhœa and tenesmus would occur almost immediately and continue for two to four weeks.

Dietetic Treatment.

In 1956 an attempt was made to alleviate these symptoms by dietary adjustment in a group of 50 patients, all other aspects of the therapy remaining unchanged. A dietary regime was planned, giving consideration to the following points.

1. The fæcal residue was rendered as small as possible during the period in which the radon was in position in the vagina.

2. During the four weeks of X-ray therapy the food passing through the intestine was made as bland as possible (that is free from irritants both chemical and mechanical) and the hemicellulose content reduced.

3. A fluid intake of approximately two litres daily was given.

4. Protein and vitamin intake were maintained at an adequate level.

In order to achieve this the following regime was evolved. Two days prior to the insertion of radon a low residue diet was commenced and continued until the radon was removed. The patient then increased her diet but avoided all foods which might be chemically or mechanically irritating. This type of bland, low fibre diet was continued for four weeks, by which time the X-ray therapy had been completed and the reaction had subsided. Her diet was then increased gradually until she was taking a normal diet with no restrictions.

Details of the Diets Used.

The low residue diet was planned to include eggs, soft meats, half a pint of milk daily, butter, refined cereals (rice, vermicelli, macaroni, sago, cornflour, semolina, oatmeal), white bread, plain biscuits, plain sponge cake, sugar, honey, jelly, lemonade, fruit juices, yeast extracts and clear soups. Low residue diets are usually based on information concerning the undigested and unabsorbed residue of foods in experiments carried out on dogs by Hosoi and co-workers in 1928. That the results of such experiments can be applied *in toto* to humans must be questioned, for the canine digestive tract adapted to a carnivorous diet may have different digestive and absorptive capacities from that of the average human being. Thus butter fat was shown to leave a large residue in dogs, yet a normal human being can absorb 90-95% of butter fat. The wisdom of including strained orange juice for the patient on the low residue diet was queried at first; however, 25 of the patients were given three ounces of orange juice daily without any sign of it causing diarrhœa. The bland, low fibre diet excluded whole grain cereals, vegetables with coarse fibres (celery, onions, cabbage, salad vegetables, tomato seeds and skins), fruits with seeds, skins or coarse fibres (pineapple and orange pulp, berry fruits etc.), meat with coarse fibres, curries, seasoned meats, sausages, spices, fried foods, nuts, dried fruits, coconut and jams with seeds and skins.

The diet was based on the following foods, giving a daily intake of 2000 Calories, 90 grammes of protein, and adequate amounts of minerals and vitamins. Milk, one and a half pints; egg, one; cheese, one ounce; meat or fish, four ounces; fruit juice, five ounces; soft vegetables, six ounces; oatmeal or "Enertone",[1] one and a half ounces; white bread, six ounces; butter, one ounce; yeast extract, one teaspoon.

Results.

Fifty patients were placed on this regime and their course was followed from the time of their admission to the ward until several months after the cessation of X-ray therapy. The results are shown in Table I. Of the 50 patients, 27 had no diarrhœa at any stage; 12 patients experienced an increased frequency of bowel action, which they described as "looseness of the bowels" rather than as diarrhœa. This activity of the rectum was noticed by some to occur immediately after a meal, particularly after breakfast, and was apparently an exaggerated gastro-colic reflex. These patients were not unduly inconvenienced by their symptoms, and unless directly questioned they would not have thought to mention them. The symptoms were of short duration, sometimes not being evident for more than two or three days, and were controlled by appropriate drugs. Five patients had a bout of diarrhœa accompanied by pyrexia, which proved to be a current epidemic infection in the community. These attacks all occurred at the same time and cleared after several days with no recurrence. Five patients experienced moderately severe diarrhœa, while only one patient, aged 80 years, had severe and persistent diarrhœa, but she refused to take the medicine prescribed to help to control it. Five patients attributed their diarrhœa to dietary indiscretions, and one to the taking of an aperient. Thirty-nine patients experienced no tenesmus, nine had slight to moderate pain, while two patients (one of whom was the woman aged 80 years mentioned previously) had severe pain which caused them considerable distress. These results were a definite improvement on those of 1955, and the regime was adopted as a routine.

It is now 18 months since this routine was instituted. The original regime has been modified and improved. The patients are no longer routinely subjected to an enema when the radon is removed, glycerin suppositories being used if necessary; an enema has rarely to be given. Severe gastro-intestinal disturbances and tenesmus have ceased to be a feature of this course of therapy and are now encountered only on rare occasions.

A few patients were also referred for dietary control from the radiotherapy department. These patients had undergone treatment with radon outside the hospital and had received no dietary instructions before coming to this clinic for X-ray therapy. They suffered moderately severe diarrhœa, but responded rapidly to dietary adjustment and the drugs prescribed.

[1] "Enertone" is a proprietary cereal composed of semolina, finely ground wheatgerm, soya bean flour and brewer's yeast.

Following the successful use of this dietetic regime in patients with carcinoma of the uterus, it was adapted for patients with carcinoma of the bladder who were experiencing similar intestinal reactions during supervoltage radiation therapy. This regime proved equally successful in these cases.

TABLE I.

Symptoms of Diarrhœa and Tenesmus Occurring in Fifty Patients on Dietary Regime.

Number of Patients.	Diarrhœa.	Tenesmus.
27	Nil.	Nil.
8	Mild.	Nil.
3	Mild.	Mild.
1	Mild.	Moderate.
4	Moderate.	Mild.
1	Moderate.	Severe.
1	Severe.	Severe.
5	Epidemic infection.	Nil (four). Moderate (one).
Total. 50	23	11

Note.—It will be noted that 38 patients had minimal or no symptoms, and only two patients had severe and distressing diarrhœa and tenesmus.

Discussion.

Diddle *et alii* (1956) drew attention to the importance of nutrition in the irradiation treatment of cervical carcinoma. They found that varying degrees of proctosigmoiditis occurred temporarily in all patients who weighed less than 150 pounds and in most of those who weighed more than 150 pounds near the end of treatment or shortly after it was completed. Those who weighed 100 pounds or less suffered most. They concluded that well-nourished patients tolerated irradiation treatment better than those on substandard diets.

A similar inverse correlation between weight and severity of reaction was not observed in the present series. Most of the patients were in a satisfactory nutritional state at the time of their admission to hospital. Twenty patients had maintained their normal weight for six months prior to their admission to hospital; eight had gained weight, while 22 patients had lost weight. It may be that the patients treated by Diddle experienced some selective dietary treatment or advice during the period they were under observation. In presenting a suitable high protein and nutritious diet to his patients it is likely that irritants such as spices, curries and coarse hemicellulose fibres were omitted or reduced in amount. The present study indicates that the maintenance of a satisfactory nutritional state during therapy is a most important factor in the general condition of the patient. This is in accordance with the findings of Schmitz (1952).

The total irradiation dosage to the cervix and the rectum might reasonably be supposed to play an important part in the severity of symptoms. However, in this group of 50 patients there was no evidence of a direct correlation between the severity of symptoms and the radiation dose as calculated by the medical-physics department, although the patient with severe diarrhœa was amongst the group of eight who received the highest rectal dose of radiation.

In conclusion it may be stated that during irradiation the maintenance of a satisfactory nutritional state by a carefully controlled dietetic regime will enable the patient to obtain maximum benefit with minimal distress from side effects, particularly diarrhœa.

Summary.

1. Rational dietary control is an important adjunct to modern therapeutic medicine.

2. Fifty patients receiving radon and X-ray irradiation for carcinoma of the uterus were placed on a dietary regime to observe its effect on the diarrhœa and tenesmus which so often accompany this therapy.

3. Thirty-eight of the 50 patients so treated had minimal or no distressing symptoms from the therapy; only two patients had severe symptoms. This was a considerable improvement compared with results observed in 1955. The regime has now become a routine for patients receiving this therapy, and the incidence of diarrhœa and tenesmus has been considerably reduced.

4. During the treatment of carcinoma of the bladder with supervoltage radiation this regime gave equally successful results.

Acknowledgements.

I wish to thank Dr. W. Holman, Dr. G. Kurrle, Dr. C. Minty and the staff of the Peter MacCallum Clinic, Melbourne, for their interest and assistance in carrying out this study.

References.

BLACK, M. M., and SPEER, F. D. (1957), "Human Cancer", The Year Book Publishers, Chicago: 186.

DIDDLE, A. W., DAVIS, M., O'CONNOR, K. A., and BROWN, B. (1956), "Importance of Nutrition in the Irradiation Treatment of Cervical Carcinoma", *Am. J. Obst. & Gynec.*, 71: 768.

HOSOI, K., ALVAREZ, W. C., and MANN, F. C. (1928): "Intestinal Absorption: A Search for a Low Residue Diet", *Arch. Int. Med.*, 41: 112.

SCHMITZ, H. E. (1952), "Treatment of Carcinoma of the Cervix", *Am. J. Obst. & Gynec.*, 64A: 289.

Reviews.

Progress in Gynecology: Volume III. Edited by Joe V. Meigs, M.D., and Somers H. Sturgis, M.D.; 1957. New York and London: Grune and Stratton. 9″ × 6″, pp. 800, with many illustrations. Price: $15.50.

THE first volume of "Progress in Gynecology" was prepared to provide a refresher course in gynæcology for doctors returning from service in the second World War. Volume II was a supplement to this. Volume III has rather a different aim, that of filling the needs of those who wish to have current concepts of the subject presented in one book. It contains 58 articles on a variety of subjects, grouped into 10 sections dealing respectively with growth and physiology, diagnostic methods, functional disorders, interrelationships of endocrine glands, sterility and reproduction, infections, benign growths, malignant growths, operative techniques and pre-operative and post-operative care. To avoid repetition it is designed to be used in conjunction with the two earlier volumes of the series and with "Surgical Treatment of the Cervix", by J. V. Meigs, who is one of the two editors of the series. This volume should be most useful to gynæcologists and to others with an interest in the field of gynæcology.

Vertigo and Dizziness. By Bernard J. Alpers, M.D., Sc.D.; 1958. New York and London: Grune and Stratton. 8¼″ × 5¼″, pp. 128, with four illustrations. Price: $5.00.

THIS small volume of 120 pages is devoted wholly to the problem of vertigo. It commences with a brief outline of the anatomy and physiology of the vestibular apparatus and its central connexions. The successive chapters deal with the mechanisms in the production of vertigo, and the symptomatology, ætiology, differential diagnosis and treatment of vertigo.

A small volume of this kind is welcome to underline the importance of this symptom and the recognition of its significance. In the words of Sir Charles Symonds, "the diagnosis of vertigo implies a disorder of the peripheral vestibular apparatus or its central connections". The adequate analysis of vertigo is one avenue to the solution of many difficult neurological problems.

There are, however, many criticisms which may be made of this book. First, it is somewhat repetitious and suffers from a defect apparent in some American texts, namely, the presentation of many conflicting views without direction from the writer as to which are likely to be true. It is rather unfortunate that the physiology of vestibular junction has been presented without a full account of the Hallpike methods of performing caloric tests. The diagnostic value of caloric tests in central, including cerebral, lesions has not been discussed. Despite the author's insistence that "vertigo"

be adequately defined, there remains some doubt from his description as to what exactly the symptom means. It cannot be emphasized too much that a sense of rotation is not required for the diagnosis of vertigo. Vestibular neuronitis does not receive adequate description. Despite these criticisms, the book contains much valuable information, but it will be, perhaps, of more use to the discriminative reader than to the beginner.

Having a Baby. By J. F. Robinson, M.B., Ch.B.; Second Edition; 1958. Edinburgh and London: E. and S. Livingstone, Limited. 7¼" × 4½", pp. 108, with many illustrations. Price: 6s. 6d. (English).

THIS book contains all that married couples intending to become parents need to know concerning the begetting of children. It is concise, clearly and simply written and well illustrated. Every stage from conception to the birth of the child is discussed. Chapters on ante-natal care, the psychological and physical preparation of the mother for the birth of the child, and also post-natal care of mother and child, are ably dealt with. Two subjects, ignorance concerning which often causes marital distress—namely, sterility and contraception—have also been included. This small book should assist young married couples along the best way to parenthood.

The Care of the Expectant Mother. By Josephine Barnes, M.A., D.M. (Oxon.), M.R.C.P. (London), F.R.C.S. (England), F.R.C.O.G.; 1956. London: Pitman Medical Publishing Company, Limited. 9" × 5¾", pp. 280, with illustrations. Price: 30s.

THIS little book by a distinguished London obstetrician is designed for general practitioners doing obstetrics. The book is well set up and printed on good paper and has a number of interesting diagrams and X-ray plates. It is very readable. While not pretending to be a complete text-book, it has the very refreshing feature of selecting the important points for discussion and giving practical details and the author's opinions without attempting completeness. The teaching is obviously that of University College, London. There are good sections on elementary physiology, principles of ante-natal care, Rhesus factor, posterior positions of the occiput, breech presentation, external version, pre-eclampsia, and a wide range of diseases associated with pregnancy. The chapter on cardio-vascular disease is excellent. It is surprising how much information is packed so readably into this small book. Actual details of treatment are usually given. Some would consider the author's indications for elective Cæsarean section too plentiful, and she is too ready to undertake X-ray examination of the mother and fœtus when clinical diagnosis would give the information required. However, this book is an excellent refresher course on thoroughly up-to-date opinions which could be fully absorbed in a week-end.

Marriage and Personality: A Psychiatric Study of Inter-Personal Reactions for Student and Layman. By Ainslie Meares, M.B., B.S., B.Agr.Sc., D.P.M.; 1958. Springfield, Illinois: Charles C. Thomas, Publisher. 8" × 5¾", pp. 158. Price: 30s. (English).

DR. MEARES is a Melbourne psychiatrist already well known for his original research and skill in hypnotic techniques, about which he has written several articles and books. This book is about the common interpersonal reactions of the various personality types in marriage, and is written "for student and layman". The author, aware that his psychiatric colleagues may regard him askance for writing in this way for the lay public, states his motive in the preface: "In the field of psychiatry much technical knowledge has accumulated which concerns the matter of living. If it could be presented in appropriate form, this knowledge may work for the happiness of the people as a whole."

Those who will find this book most helpful will be medical students, general practitioners, social workers, marriage counsellors and ministers of religion. Other intelligent and educated people will also find it useful, but the average "man in the street" and young people are likely to be confused and even frightened as they read, for instance, of the difficulties of the introvert in courtship and marriage. Many technical psychiatric terms (for example, "rationalisation", "masochism") are used without explanation of their meaning, and a glossary would be a valuable addition to the book. Moreover, although Dr. Meares, in describing the personality types, states the danger of over-simplification and the fact that "pure" types are uncommon (most people possessing features of two or more personality types), the average layman is still likely to be misled by such sweeping statements as "The introvert bride often finds it difficult to let herself be touched", or "Complete maturity requires . . . the development of mature masculinity or femininity, and the establishment of a free heterosexual erotic life".

Nevertheless, the book is a contribution which should be of great value to all who are, or will be, trying to help people with marital problems. Extraverts, introverts, obsessives, hysterics, paranoid personalities, latent inverts, psychopaths and alcoholics, and their characteristic reactions in marriage, are all described. The chapter on the latent invert, both male and female, is particularly good. The advice given on ways of adjusting to the various difficulties is for the most part practical and realistic, though again the reader needs to be aware of the necessity of taking individual variations into account.

The style is terse, didactic, dogmatic and clear. There are several misprints. There is no index, but this is of little consequence as the list of contents in the front of the book is quite detailed. The book is well bound and printed.

The Impact of the Antibiotics on Medicine and Society. Monograph II, Institute of Social and Historical Medicine. The New York Academy of Medicine, Iago Galdston, M.D., Editor; 1958. New York: International Universities Press, Incorporated. 8½" × 5½", pp. 232, with illustrations. Price: $5.00.

THE Institute of Social and Historical Medicine was set up by the New York Academy of Medicine to publish a series of monographs which should constitute a searching inquiry into medical history in the attempt to solve contemporary medical issues and problems. The second monograph is entitled "The Impact of Antibiotics on Medicine and Society". There are fourteen papers by experts in some branch of microbiology or of the history of medicine. There are two historical papers, "Galenicals and Galenism in History" and "The Continued Prevalence of the Conception of Macrocosm and Microcosm in the Seventeenth Century", which do not appear to have much to do with antibiotics. The other papers cover the ground of the discovery, isolation and uses of antibiotics in a very interesting and complete fashion, but without detailed clinical applications. Henry Welch writes an account of the development of antibiotics since 1943 and gives some extraordinary figures showing the increases in production. J. E. McKeen discusses "The Role of Industry in the Mass Production of Antibiotics". There are papers on the application of antibiotics to the livestock industry and to plant husbandry as well as to the clinical practice of medicine. More general papers deal with changes in mortality and morbidity, hospitals and public health practices and the effects of antibiotics. A final chapter is on "The Effects of Antibiotics on Society". All the papers are interesting, full of information given by experts in the field, and as up to date as is possible in such a rapidly developing subject. The book can be recommended to all medical men, microbiologists, and educated laymen for interesting and instructive reading.

Industrial Toxicology. By Lawrence T. Fairhall; 1957. London: Baillière, Tindall and Cox. 10" × 6½", pp. 386. Price: 80s. (English).

THE use of a multitude of chemical processes in industry has given the study of industrial toxicology a position of great importance; and although the true assessment of industrial hazards from chemical substances is a very specialized problem, any book which provides a quick and easy source of reference in this field is bound to be widely used. This book, now in its second edition, attempts to do this in a volume of reasonable size. The book is divided into two parts, dealing respectively with inorganic substances and carbon compounds. Each substance is dealt with in monograph form, starting with a concise outline of the properties of the material, its principal industrial uses and a documented discussion of the relevant toxicology. The section concludes with a brief discussion of the analytical methods appropriate for industrial purposes, and a useful list of the main references is appended at the end of each monograph.

The coverage of this book is reasonably complete, but it must be borne in mind that the substances considered are those used industrially and drugs are not included. There are a few examples of toxic reactions resulting from the industrial handling of drugs which could have been included, but such cases are rare, and such substances are usually handled by people well informed upon the risks involved. The insecticides, solvents, plasticizers, photographic chemicals and pigments are among the substances included, and the

book should be a valuable reference source for medical men who are concerned with industrial health problems.

The difference between the first and second editions of this book is largely one of completeness, resulting from the inclusion of many new substances which have come into industrial use during the last few years.

Human Infertility. By C. Lee Buxton, M.D., Med.Sc.D., and Anna L. Southam, M.D., with a chapter on Endometrial Diagnosis by Earl T. Engle, Ph.D.; 1958. New York: A Hoeber-Harper Book. 9" x 6", pp. 241, with 40 illustrations. Price: $7.50 (abroad).

THIS small monograph is based on the authors' experience in treating 2000 patients in the Sloane Hospital Infertility Clinic, New York. It is a credit to the publishers, who have produced a volume that can be carried in one pocket, and is well bound and printed on glossy paper in type of readable size, with clear black and white reproductions. Salpingograms are notoriously difficult to reproduce, but the ones in this book exhibit good contrast.

The introductory chapters devoted to the basic science of the subject are excellent and up to date, and deal with ovulation, the menstrual cycle and the differential diagnosis of menstrual abnormalities. The succeeding chapters devoted to hormone dysfunctions are clearly and impressively expounded, particularly in relation to the adrenal gland. A special section has been contributed by the late Earl Engle on the histological changes in the endometrium during the menstrual cycle. It is short but eminently instructive and practical. A chapter devoted to fertility potential should be read by all budding investigators in infertility studies before they plan any research into the problem.

The part of the book devoted to amenorrhœa is modern in its theory and clinical precepts, and will stimulate a deeper interest in this neglected symptom amongst those whose previous approach has been perfunctory and whose treatment has been to administer some œstrogen and hope for the best. The multiglandular origin of this disorder is well stressed. Most hormonal dysfunctions seen in practice receive sufficiently adequate description to prompt the reader to re-study them in more exhaustive books. The diagnostic and therapeutic measures used in childless marriage are covered with reasonable detail and leave one with a modern orientation towards accepted attitudes and techniques. There are few omissions, one being the fundal test for sperm invasion. There is an interesting chapter on the assessment of the male, but treatment is not discussed in detail. The subject of retrograde ejaculation has been omitted.

The bibliography is not extensive and is largely but not completely confined to American sources. The text is entertainingly illustrated with some apposite records of case histories. The book will be favourably received by the general practitioner eager to advance his knowledge of a subject that is inadequately dealt with in the usual curriculum of medical studies. The specialist will not find much new help on advanced problems in sterility, but it is recommended to him as an example of how to expound the intricacies of a subject that involves endocrine dysfunctions without boredom or verbosity. The book, in a few words, is safe, sound, orthodox and modern, and the only improvement would be to devote more space to the subject of therapy.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Rehabilitation of the Cardiovascular Patient", by Paul Dudley White, M.D., Howard A. Rusk, M.D., Philip R. Lee, M.D., and Bryan Williams, M.D.; 1958. New York, Toronto, London: McGraw-Hill Book Company, Inc. 8" x 5¼", pp. 192, with 31 illustrations. Price: $7.00.

This book is directed to "all practitioners who bear the responsibility for the management of patients with cardiovascular disabilities".

"The Year Book of Orthopedics and Traumatic Surgery (1957-1958 Year Book Series)", edited by Edward L. Compere, M.D., F.A.C.S., F.I.C.S., with a section on plastic surgery edited by Neal Owens, M.D., F.A.C.S., F.I.C.S.; 1958. Chicago: The Year Book Publishers. 7½" x 4½", pp. 464, with 228 illustrations. Price: $7.50.

One of the Practical Medicine Series of Year Books.

"Abortion in the United States: A Conference Sponsored by the Planned Parenthood Federation of America, Inc., at Arden House and the New York Academy of Medicine", edited by Mary Steichen Calderone, M.D., M.S.P.H.; 1958. New York: A. Hoeber-Harper Book. 9" x 6", pp. 232. Price: $5.50.

Deals with both therapeutic abortion and the illegal abortion problem.

"Progress in Arthritis", edited by John H. Talbott, M.D., and L. Maxwell Lockie, M.D.; 1958. New York and London: Grune and Stratton. 9" x 5¾", pp. 464, with many illustrations. Price: $12.50.

Contains discussions by recognized authorities on selected subjects in the broad field of arthritis, rheumatism and collagen tissue disorders.

"Drugs of Choice: 1958-1959", edited by Walter Modell, M.D.; 1958. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical), Limited. 10" x 6¾", pp. 931. Price: £7 0s. 3d.

This book sets out to be "a practical guide to the selection of the best drug for a particular therapeutic problem".

"Cunningham's Manual of Practical Anatomy: Volume III. Head and Neck: Brain", revised by James Couper Brash, M.C., M.D., D.Sc., LL.D., F.R.C.S. (Ed.), F.R.S.E.; Twelfth Edition; 1958. London, New York, Toronto: Oxford University Press. 7¾" x 5", pp. 532, with 231 illustrations. Price: 46s. 6d.

A revision incorporating the English equivalents of the Paris Nomenclature approved by the International Anatomical Congress of 1955.

"Science and Psychoanalysis": Volume I. Integrative Studies. Edited by Jules H. Masserman, M.D.; 1958. New York, London: Grune and Stratton. 8¾" x 5", pp. 208. Price: $5.75.

Consists mainly of the scientific transactions of the Academy of Psychoanalysis.

"Biophysical Principles of Electrocardiography": Volume 1. Electrocardiographic Analysis. By Robert H. Bayley, M.D.; 1958. New York: Paul B. Hoeber, Inc. 10" x 6¼", pp. 251, with many illustrations. Price: $8.00.

The first of two volumes, the second of which will deal with clinical applications.

"The Tissues of the Body: An Introduction to the Study of Anatomy", by W. E. Le Gros Clark, F.R.S.; Fourth Edition; 1958. Melbourne: Oxford University Press. 9¼" x 5¾", pp. 426, with 126 illustrations. Price: 64s. 6d.

The book has been revised and in places rewritten since the third edition appeared in 1952.

"The Year Book of Dermatology and Syphilology (1957-1958 Year Book Series)", edited by Rudolf L. Baer, M.D., and Victor H. Witten, M.D.; 1958. Chicago: The Year Book Publishers. 7¾" x 5", pp. 496, with 62 illustrations. Price: $8.00.

One of the Practical Medicine Series of Year Books.

"The Chemistry and Chemotherapy of Tuberculosis", by Esmond R. Long, M.D., Ph.D., Sc.D.; Third Edition; 1958. Baltimore: The Williams and Wilkins Company. 9" x 6", pp. 474, with illustrations. Price: £6 12s.

"A compilation and critical review of existing knowledge on the chemistry of tubercle bacilli and their products, chemical changes and processes in the host, and chemical aspects of the treatment of tuberculosis."

"Laboratory Medicine: Hematology", by John B. Miale, M.D.; 1958. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical), Limited. 10" x 6¾", pp. 735, with 192 illustrations and nine plates, including five in colour. Price: £7 11s. 3d.

The author emphasizes the correlation between clinical and laboratory data.

"Lumbar Disc Lesions: Pathogenesis and Treatment of Low Back Pain and Sciatica", by J. R. Armstrong, M.D., M.Ch., F.R.C.S.; Second Edition; 1958. Edinburgh and London: E. and S. Livingstone, Limited. 9¾" x 6¼", pp. 244, with 60 illustrations. Price: 45s. (English).

The author is provocative, but the foreword states that his work "portrays for the most part the views of contemporary British orthopædic surgeons".

The Medical Journal of Australia

SATURDAY, AUGUST 16, 1958.

THE PATIENT'S FIFTH QUESTION.

It has been said that the intelligent patient, consulting his doctor, may ask five questions: (i) What have I got? (ii) Can it be cured? (iii) What is to be done about it? (iv) What caused it? (v) How could it have been prevented? The questions come in about that order. How far down the list the inquirer goes depends somewhat on his intelligence. He may not go beyond question (iii). At any rate, the wise doctor should be ready with an honest answer for the whole five: diagnosis, prognosis, treatment, ætiology (and pathology), and prevention. Intelligent patients expect information from their doctors on the prevention of illnesses, where such measures are practicable. That is the modern outlook on medical practice, and several text-books cover the field. The new edition of Leavell and Clark's "Preventive Medicine for the Doctor in His Community"[1] is designed—according to the cover paper—to develop in practitioners and senior students "a point of view, a philosophy, and a method of approach to health promotion and disease prevention". The book provides "an epidemiologic approach to preventive medicine for those in or expecting to enter private practice". It stresses the point that preventive medicine is a matter for organized community action: that is what the term "social medicine" now connotes. It is only when the efforts of private medical practitioners are effectively linked with those of official and voluntary health organizations that the best state of the people's health can be assured.

Ten years ago, when Professor John Ryle wrote his little book "Changing Disciplines", the term social medicine had hardly been defined. Ryle considered social medicine and social pathology as dealing with social groups, societies or larger populations, just as clinical medicine and pathology ordinarily concern individuals. Social pathology he viewed as the science related to social medicine: "If clinical medicine is a comprehensive term, implying both clinical practice and the theory and discipline necessary for advancement of knowledge and the improvement of practice, social medicine is even more so." It embraced (for Ryle) both the activities of the public health administration and those of the remedial and allied social services, as well as the special disciplines necessary for the advance of knowledge relating to sickness and health in the community. Social pathology dealt with disease in the community, and social hygiology (an unfortunate cacophonous term) with community health. Ryle was a man of unique experience. After long years in clinical medicine, during which his posts included those of senior physician at Guy's Hospital and later Regius Professor of Physic in the University of Cambridge, he became in 1943 the first professor of social medicine in the University of Oxford. His small book on social medicine is still worthy of study. It is at least a minor classic.

The book by Professor Hugh Leavell and Professor Gurney Clark is much larger than Ryle's, and goes into the subject in some detail. Till twenty years or so ago, public health, as a subject in the students' course and as a community activity, dealt mainly with environmental hygiene (especially drains, privies and refuse disposal), the control of infectious diseases and the supervision of food supplies. Those are still important functions and are always likely to be, though now the active participation of the medical officer therein is required less commonly. Many of the problems of sanitation have come to the province of the engineer, and much of the routine practice of public health work to public health nurses and health inspectors. In most countries now, public health work deals mainly with people; an American book published a few years ago was titled "Public Health *is* People". The idea is not new. Long years ago Disraeli gave a lasting definition: "The great question, the great social question, which should engage the attention of Statesmen, is the health of the people. That is a question which really almost comprises every object we wish for. It refers to all subjects, which, if properly treated, may advance the happiness and comfort of men." Today the practice of public health is wide. In the health departments of many cities in North America, for instance, large staffs of trained nurses serve as health visitors; they are assisted by social workers dealing with problem families and delinquent children and similar community problems. In many English cities there are similar activities. The medical officer of health still directs the work, but over the years its nature has radically changed.

Most of the new text-books on public health are designed to interest the private medical practitioner in the work of official and voluntary health agencies, and to obtain his cooperation. The book by Leavell and Clark has just those aims. The authors are prominent leaders in the public health schools of Harvard and Columbia respectively. The book hardly refers to the old-time matters of drains and sewers and rubbish disposal. It is concerned rather with the natural history of various illnesses and with how preventive measures can be applied in different ways and at different stages. It is all very illuminating. Cardiovascular diseases, arteriosclerosis, respiratory and digestive troubles, nutritional disorders, mental health and occupational health—all are considered from the viewpoint of prevention. Basic principles, rather than details and minutiæ, get most attention. A large number of useful charts illustrate the text, but, as always, the reader must take care lest he put the "chart before the horse". The book indicates the trend of medicine today. The principles it enunciates are applicable all over the world; the detail refers almost exclusively to organizations in North

[1] "Preventive Medicine for the Doctor in His Community: An Epidemiologic Approach", by Hugh Rodman Leavell, M.D., Dr. E. Gurney Clark, M.D., Dr.P.H., and nineteen contributors; Second Edition; 1958. New York, Toronto, London: McGraw-Hill Book Company, Inc. 9" x 5¾". Price: $10.00.

America. On that account the value of the book is somewhat reduced to practitioners in other countries. However, the libraries of health departments and medical schools everywhere will welcome this compact and comprehensive study of current American ideals and practice, and will find it valuable for reference and guidance. For the doctor in general practice it will foster the attitude of mind necessary in formulating sound answers to question (v) in its various guises.

Current Comment.

WATER AND SALT BALANCE IN MARINE ANIMALS.

THE physiology of salt excretion in marine mammals and birds presents a peculiar problem in that they, unlike terrestrial animals, as a rule have no evident supply of hypotonic fluid available with which to wash out any excess of sodium and chloride in their body fluids. They live in a hypertonic medium, and to drink sea-water will only aggravate the problem. What then is their source of water, and how do they dispose of excess sodium chloride? Since they live in a cool, and often very cold, medium, it is clear that percutaneous loss of both water and salt is likely to be very small, and is in fact probably negligible. The question is often raised whether marine birds and mammals drink sea-water. Animal physiologists who have considered the matter have mostly concluded that they do not, and that they obtain their water from the body fluids of their prey. It is known that man can maintain life, probably for long periods, on the fluid that can be expressed from raw fish. Some impressive instances were recorded during the last war of the importance of raw fish for the survival of men adrift without food or water. This fact was known to primitive navigators, but appears to have been unknown to European navigators in more recent times, till it was resurrected or discovered anew when the problems of survival at sea were being considered in the circumstances of modern war.

An interesting new light on the question of salt and water balance in marine birds has recently been thrown by the work of K. Schmidt-Nielsen and his colleagues.[1] These investigators studied the problem in a species of cormorant (*Phalacrocorax auritus*); they found that when the birds were fed with fresh fish, the water content of the fish was more than adequate for the renal elimination of salts and nitrogen, which was excreted as uric acid. However, it was found that when given a salt load, cormorants also employ an extrarenal mechanism for electrolyte elimination. Whether the load is imposed orally or by infusion of hypertonic sodium chloride solution, cormorants excrete a highly hypertonic liquid that drips out from the internal nares and collects at the tip of the beak, from which the bird shakes the drops with a sudden jerk of the head. The concentration (500 to 600 millinormal sodium chloride) and the rate of secretion (up to 0·2 millilitre per minute in a 1·5 kilogram bird) are so high that with continuous secretion the entire sodium chloride content of the body could be eliminated in roughly ten hours. The secretion contains practically only sodium and chloride, in nearly equivalent amounts. The production of the nasal secretion is stimulated also by a non-electrolytic osmotic load (sucrose), which indicates that the mechanism responds to general osmotic conditions rather than specifically to the sodium or chloride concentration of the plasma. The nasal secretion has been observed only after exposure to an osmotic load and never in fasting birds or after ingestion of fish or fresh water.

This interesting discovery provides yet another example of the resourcefulness of nature in meeting any particular problem, and necessitates a reassessment of the question in other marine birds (e.g., penguins) and in marine mammals such as seals. As man is also a mammal, the approach to the problem in the latter group might conceivably illuminate some obscure corner of human physiology.

[1] *Am. J. Physiol.*, 1958, 193: 101 (April).

A DENTAL SURVEY OF CHILDREN IN NEW SOUTH WALES.

A SUBJECT on which all sorts of people do not hesitate to generalize is the dental health of various national groups and races. The comments made are more often uninformed than informed, and we have often wondered how much justification there was for the discouraging remarks made about Australians in this respect. An important contribution to the accumulation of facts rather than guesses in this field was made by a dental survey of State School children in New South Wales carried out between January, 1954, and June, 1955, by P. D. Barnard, B.D.S., of the Institute of Dental Research at the United Dental Hospital of Sydney.[1] Finance for the survey was made available by the National Health and Medical Research Council of Australia. The survey, the report of which has come to hand only this year, covered 6787 State School children in New South Wales; the aim was to make the scope of the survey wide enough to ensure that the results obtained should be a reliable measure of the dental condition of the school population of the State. The three particular aims in view when the survey was undertaken were: first, to assemble data on the prevalence[2] of dental caries for their own sake; second, to assemble data which would make possible the assessment of the value of preventive measures if and when those measures should be instituted; and third, to make possible an assessment of the magnitude of the cost of instituting and maintaining a scheme of effective treatment. In the survey carefully standardized clinical and radiographic methods were used. The conditions observed and recorded included the prevalence and intensity of the caries-experience[3] in permanent teeth, the eruption of permanent teeth, treatment received, oral hygiene, the gingival state, malocclusion and the prevalence of enamel hypoplasia and hypocalcification.

The results showed that dental caries was widespread among the children of the State, and the caries-experience was of considerable magnitude. Thus in 98·5% of the children in the age groups from six years to fifteen years inclusive, teeth of one or other dentition were affected, and in 88·7% permanent teeth were affected. The number of D.M.F.[4] permanent teeth per child was 6·6. The report points out that it is difficult to compare the findings with those in other populations because of the lack of uniformity in the methods of conducting dental surveys. It would appear that populations living under conditions of western civilization show a very wide prevalence of dental caries, which increases rapidly with increase in age, and the New South Wales figures conform to this general pattern. On the contrary, the prevalence in India is remarkably restricted in the same age groups. Comparisons of the findings between boys and girls in the New South Wales survey showed a significant difference in prevalence, and also indications of a similar difference in caries-experience.

[1] "Dental Survey of State School Children in New South Wales, January, 1954-June, 1955", by P. D. Barnard, B.D.S.; 1956. National Health and Medical Research Council Special Report Series No. 8. 9¼" x 6", pp. 69, with illustrations. Price not stated.

[2] The term prevalence is used to indicate the degree of dissemination of a disease throughout the population at risk at a given time. Thus the percentage of children with one or more carious lesions is an expression of prevalence.

[3] The term caries-experience is used to express the accumulated amount of caries which has occurred at any time in the life of the individual, up to the time of examination. Thus the number of D.M.F. teeth or surfaces per child or per 100 teeth or surfaces indicates caries-experience.

[4] The term D.M.F. teeth relates to teeth which are carious or decayed (D), missing (M) or filled (F).

Girls were found to be affected earlier and hence cumulatively to a greater degree than boys at any given chronological age. The phenomenon has been attributed to the earlier eruption of the permanent teeth in girls, whose teeth have therefore a greater post-eruptive age at any given chronological age. However, when the mean number of decayed or filled teeth per child is plotted against the mean number of erupted teeth per child for each age group, it is seen that girls are no more susceptible than are boys. Prevalence and caries-experience are both higher for the Sydney metropolitan area than for the country. A lower dental caries-experience than that for children of the same age group in the general population of the State was found amongst children in three special groups: children at Hopewood House, Bowral, whose intake of refined carbohydrate is restricted; English children at Dr. Barnardo's Homes Farm at Picton, who have a standard regime of meal hours with little consumption of food between meals; a group of children from Warren who receive fluorine from a communal water supply.

A large amount of dental attention had been received by the children, and an equally large amount was still required. City children had received more treatment than country children, and an assessment of oral hygiene showed that for the majority (70%) of the children this was fair; for a minority (12%) it was bad. In about 75% of the children gingival inflammation was observed, and in 15% the condition was advanced enough to require treatment. Malocclusion of some degree was observed in about 80% of the children, and Barnard comments that the caries-experience in both dentitions (deciduous and permanent) which results in the early loss of teeth was responsible for a great amount of the malocclusion observed. Hypoplasia or hypocalcification of the enamel was observed in nearly 30% of the children. With very few exceptions these conditions were not due to fluorine in the water supplies. Barnard states that chronic endemic fluorosis is not a problem in New South Wales, and that there is no reason to believe that the controlled fluoridation of domestic water supplies would produce any change in the prevalence of hypoplastic teeth and teeth showing opacities of the enamel.

Barnard's over-all comment on the survey is that the increase in the number of untreated carious lesions is not stemmed until the child is fourteen or fifteen years of age; and he goes on to point out that the problem of dental disease can be solved only by such means as the intensification of dental health education of the child and parents, including instruction in nutrition and dietetic habits, the provision of greater facilities for treatment, the institution of the practice of fluoridation, and research. No doubt this report will have come to the notice of the appropriate authorities before this, and it is to be hoped that the recommendations have been heeded. There are no grounds for complacency in the report, especially when practical means exist to improve the position.

THE INTESTINE IN UROLOGICAL SURGERY.

Two years ago in this column we published a review of the various anatomical bladder "substitutes", which have been employed in the chequered history of surgical attempts to provide a satisfactory replacement in cases in which for any reason the normal bladder is missing.[1] The basic ideas of most of these procedures were first tried out fifty or sixty years ago, and with various modifications they have been adopted, discarded and tried again as successive generations of surgeons have tried to pick their way between the thorns of ascending infection, urinary obstruction, fistulæ, electrolytic imbalance and so on, in an attempt to give the patient a tolerable survival. Ureterocolic anastomosis was for a time a widely accepted procedure, but has suffered a measure of eclipse since the publication in 1952 of a large-scale study of the results of this operation by Jacobs and Stirling.

[1] M. J. AUSTRALIA, 1956, 1: 1050 (June 23).

Recent publications suggest that the use of a loop of ileum as a bladder substitute is at present enjoying a considerable degree of popularity. In 1956 C. A. Wells[1] published an analysis of 395 cases of the use of the intestine in urology, omitting cases of uretero-colic anastomosis. Of the 395 patients concerned, the greatest number (212) underwent the operation of ileal ureterostomy, the main indications being carcinoma of the bladder and congenital deformity. When ileal ureterostomy was combined with total cystectomy for malignant disease, the operative mortality was nearly 30%, and the list of complications which contributed to this mortality was formidable, paralytic ileus being the most important. However, the results in patients with congenital abnormalities are very much better, and in good risk patients with non-malignant conditions the operation is not considered particularly dangerous, considering the gravity of the procedure.

In a more recent paper L. N. Pyrah[2] discusses the use of segments of the small and large intestine, with special reference to the problems of uretero-colic anastomosis. This discussion is based on a series of 72 operations (on 69 patients) performed by Pyrah and one of his colleagues, in which they used isolated segments of the large or small intestine for urological purposes. The operations were of two kinds. In the first, loops of ileum were used to remodel the bladder or part of a ureter, or to restore such parts anatomically and allow them to serve their original purpose; in the second, loops of the small or large intestine were used to construct a conduit or a reservoir for urine as a method of urinary diversion alternative to the orthodox uretero-colic anastomosis. With regard to the first problem, Pyrah concludes that a loop of ileum can be incorporated into the urinary tract with little fear of hyperchloræmic acidosis, but that hyperkalæmia may occur if renal function is inadequate. With ileal replacement of the ureter, early results have been satisfactory, but the number of cases is small. With ileo-cystoplasty, it seems that remodelling of the contracted bladder by incorporating into it intestinal muscle of different power and discipline is normally a successful procedure, but it does not achieve in every case a perfectly integrated contraction. Evacuation may therefore be incomplete. In three patients the ileum was used as a reservoir for urine, being anastomosed to the urethra, while the ureters were anastomosed to either end of the loop. The early results are promising. When an isolated loop is used as a conduit leading to an ileostomy, the procedure is a severe one, with a considerable mortality (in this series three deaths out of 11 attempts), but the surviving patients have benefited greatly by the procedure. Electrolytic imbalance has not yet occurred, and there have been no attacks of renal infection. Pyrah expresses a preference for the "recto-sigmoid bladder" first described in 1895 by Mauclaire, though little used since; he has combined this procedure with total cystectomy in 20 cases. The operation is done in two stages. In the first stage, the sigmoid colon is divided and closed about the middle of its loop, the open proximal end being brought to the surface as a colostomy; the left ureter is then implanted into the new "bladder". In the second stage, about 14 days later, total cystectomy is done, and the right ureter is implanted a little below the site of implantation of the left. Since the kidneys do not become infected in this procedure, the differential electrolytic absorption through the lower part of the bowel does not give rise to a clinical problem. Of the 20 subjects, only two died early (from peritonitis and pulmonary embolism respectively). There were four remote deaths at various periods, mostly from metastatic cancer. The remaining 14 patients are well at periods of from two to five years after operation. Pyrah therefore considers that results with the recto-sigmoid bladder are better than with uretero-colic anastomosis. Ileal ureterostomy suffers not only from a heavy immediate mortality, but from considerable morbidity, as well as from the disadvantage of a continuously draining urinary fistula. It is clear that the subject is far from being closed.

[1] *Brit. J. Urol.*, 1956, 28: 335 (December).
[2] *J. Urol.*, 1957, 78: 683 (December).

Abstracts from Medical Literature.

RADIOLOGY.

Torulosis.

J. N. WOLFE AND G. JACOBSON (*Am. J. Roentgenol.*, February, 1958) discuss the X-ray findings in patients suffering from infection by *Cryptococcus neoformans* (torulosis). Although various organs may be affected, the pulmonary, skeletal, and central nervous systems are involved most frequently. The organism is usually thought to gain entry through the respiratory tract, and thence spread to involve other parts of the body. The disease most closely simulates tuberculosis, whether the site of infection is in the lungs, in the meninges, or in bone. The X-ray appearances of the pulmonary lesions are not specific, but may vary from a segmental, fine, lace-like infiltration, limited to one or two interspaces, to a dense consolidation. Lesions having the appearance of masses which may be mistaken for peripheral neoplasms, either primary or metastatic, are also encountered. The X-ray findings in cases with skeletal involvement consist of a limited area of destruction with slight periosteal reaction. The differential diagnosis of these lesions is extensive, but primarily concerns tuberculosis, other fungous diseases, and neoplasm.

Extended Range Radiography.

G. S. SCHWARZ (*Radiology*, September, 1957) states that it is possible to extend the transmitted subject range of modern radiographs to equal the recorded subject range, thereby making possible maximum utilization of recorded information. This is accomplished by reducing the silver content of the emulsion of the film so that its density scale is limited to approximately 2·5. This represents the optimum adaptation of radiographs to the optic physiology of direct transparency viewing as far as subject range is concerned. A partial technical solution consists of the use of single-coated X-ray film. Six months' experience with the use of a commercially available film of that type is reported. An extended radiographic range and a high tolerance to overexposure were observed. A moderate loss of contrast and speed were encountered but it was thought that the advantage of extended range outweighed these deficiencies in certain radiographic applications. They can be overcome by technological modifications, which are discussed briefly.

Regional Manifestations of Scleroderma.

W. T. MESZAROS (*Radiology*, March, 1958) discusses the varied and widespread manifestations of scleroderma. Knowledge of all possible manifestations is important to the radiologist, who may be the first to suggest the correct diagnosis, especially in those cases in which the skin changes are preceded or overshadowed by involvement of internal organs. Absorption of the distal phalanges is one of the most characteristic findings; this begins distally and progresses proximally. In severe cases absorption, with a resulting pointedness, may be observed in the middle and proximal phalanges. Rarely, absorption of the distal ends of the radius and ulna and absorption of the carpal bones may occur. Periarticular soft-tissue swelling may be the only abnormality noted. Later, the joint space becomes narrowed. Marked articular destruction may be present and subluxation or synostosis may occur. These changes simulate those of rheumatoid arthritis. The destruction of the ends of the bones may be so severe that the joint dissolution resembles a neurotrophic joint, although eburnation and osseous debris are not present. Soft-tissue calcification often occurs. The calcifications are not necessarily periarticular, and usually involve the portions of the extremities which are most often subjected to pressure. Dysphagia is the most common œsophageal symptom, and the severity of the œsophageal changes is not necessarily in proportion to the extent of the skin changes. The œsophagus is widened and atonic; peristalsis is diminished or absent. The findings are more pronounced in the lower portion, but the entire thoracic œsophagus may be involved. If the patient is examined in the upright position, the œsophagus empties readily by the effects of gravity, and the dilatation may not be apparent. When the patient is placed in the recumbent position, a striking difference is noted: barium remains in the large dilated atonic œsophagus. If the patient maintains this position, the barium may remain in the œsophagus for many hours. This condition may be confused with cardiospasm. In the latter, however, there is a delay in emptying in the upright position as well as in recumbency, whereas in uncomplicated scleroderma there is no obstruction when the patient is erect. The duodenum and jejunum usually show changes earlier and more frequently than the remainder of the small bowel, although any portion may be involved. The most common finding is dilatation, varying from minimal to marked in degree; peristalsis is diminished; there is a decrease in motility and tone; the barium may remain in the small bowel for many hours; delay in transit may occur even in the presence of diarrhœa. Patients with small bowel changes may have no demonstrable œsophageal abnormalities. In the chest, the characteristic finding is a diffuse fibrosis, especially in the lower lung fields. In advanced cases, the middle and upper portions of the lung may be involved. Small cystic areas are also characteristic manifestations of the pulmonary changes.

Giant Cell Tumour of Bone.

V. R. GEE AND D. G. PUGH (*Radiology*, January, 1958) have reviewed a total of 104 cases of giant cell tumour of bone which had been seen at the Mayo Clinic up to January, 1955, and which meet with the current criteria for the pathological diagnosis, and discuss the differential diagnosis. Giant cell tumour occurring in a flat bone is essentially a destructive process lacking in distinguishing characteristics. As a rule it is impossible to differentiate it radiologically from certain other primary and secondary bone neoplasms. A trabeculated appearance is non-specific, since it is more common and often more prominent in aneurysmal bone cyst than in giant cell tumour, and may occasionally be produced by other tumours as, for example, chordoma and myeloma. Aneurysmal bone cysts cause radiographic changes most closely resembling those seen in giant cell tumour; an identical appearance may be produced by the two lesions. A greater percentage of aneurysmal bone cysts will be seen in patients less than 20 years old, but there is sufficient overlapping of the ages of patients in the two groups to limit the value of this factor. The aneurysmal cyst is more likely to be observed prior to epiphyseal fusion. In such cases it is situated on the diaphyseal side of the epiphyseal plate and does not cross it. Benign chondroblastoma, likewise, is more likely to be encountered in younger patients than giant cell tumour; it is found with relatively greater frequency in the proximal portions of the humerus and femur; the margin is often indicated by increased bone density rather than decreased density as seen in untreated giant cell tumours; vaguely defined calcification is often observed within the tumour; a trabeculated appearance is rare. Unicameral bone cysts are distinctly more common in a younger group than giant cell tumours; the majority involve the proximal ends of the humerus and femur, which are relatively uncommon sites for giant cell tumour; they occur typically on the diaphyseal side of the unfused epiphyseal line and often in later stages are seen in the diaphysis relatively remote from the epiphyseal line; a sharp line is usually seen at the margin of the cyst; a loculated appearance is common. Metastatic lesions and certain of the malignant bone tumours, especially in their early stages, may produce areas of destruction closely resembling giant cell tumours.

Benign Chondroblastoma.

G. E. PLUM AND D. G. PUGH (*Am. J. Roentgenol.*, April, 1958) state that benign chondroblastoma is a neoplasm of bone which has been recognized as a distinct entity for a relatively short time. In the past it was frequently mistaken for other neoplasms of bone of more serious consequence, notably chondrosarcoma and giant cell tumour of bone. This error has resulted in unnecessarily radical surgical procedures, usually in young patients. All but six of the tumours reported in the literature as benign chondroblastoma have involved the long bones. The most characteristic radiographic feature of this neoplasm is a central area of bone destruction which is sharply limited from the surrounding normal bone, usually by a thin margin of increased density of bone. There may or may not be an appearance of mottling within the radiolucent area. Both trabeculation and active periosteal reaction are rarely seen. The tumour, when it involves the long bones, almost always affects the epiphysis, and frequently the adjacent shaft. Rarely, the shaft alone will be involved, and then the tumour abuts on to the epiphyseal plate. A smooth, well-outlined, soft-tissue mass may be seen in the case of large tumours which have destroyed the overlying

cortical bone by pressure erosion. The most important lesions which should be considered in the differential radiographic and pathological diagnosis are enchondroma, chondromyxoid fibroma (which seems to be closely related to benign chondroblastoma), chondrosarcoma and giant cell tumour. Rarely, an inflammatory lesion or a solitary focus of fibrous dysplasia may simulate it radiographically. Metastatic carcinoma, solitary myeloma and solitary lesions of eosinophilic granuloma may resemble it after irradiation or curettage, especially in flat bones.

Juxtacortical Osteogenic Sarcoma.

B. P. SAMMONS, S. S. SARKISIAN AND M. C. KREPELA (*Am. J. Roentgenol.*, April, 1958) review briefly the cases of juxtacortical osteogenic sarcoma reported in the American literature and present a typical case with special emphasis on the radio-pathologic correlation. The authors state that the initial lesion, attached to the metaphyseal or adjoining epiphyseal region, is a lobulated juxtacortical ossifying mass with scattered areas of lesser density representing cartilage, trapped fascia and muscle. The underlying cortex, encroached upon by the broad-based mass, becomes irregular and thickened; but considering the density and size of the tumour, there is surprisingly little reaction or destruction. In the adjacent periosteum a small Codman's triangle (the zone of reactive bone formation adjacent to tumour periosteum) is often seen. Tumour growth takes place along the shaft and circumferentially, sometimes to the extent of surrounding the bone with the shaft coursing through the tumour. When first examined radiologically at this advanced stage an erroneous impression of medullary involvement may be suggested; right-angle laminography and stereoscopy may be of help in excluding cortical invasion. The periphery of the tumour may blend somewhat with denser soft-tissue structures, but as a rule it is rather sharply demarcated. After an inadequate local excision an irregular cortex is noted which soon shows renewed activity with dense irregular osseous tumour invading soft tissue. Eventually, often after two or more unsuccessful attempts at local excision, frank sarcomatous manifestations consisting of combined sclerosis and osteolysis, with destruction of the cortex and medullary cavity, become evident.

Villonodular Synovitis.

C. W. BREIMER AND R. H. FREIBERGER (*Am. J. Roentgenol.*, April, 1958) state that villonodular synovitis is a not uncommon disease of synovia, tendon sheaths and bursæ. The disease is seen in two forms. There is a circumscribed form in which single or multiple polypoid masses are attached to the synovium, and a diffuse form in which there is hyperplasia of all synovial villi and in which the entire synovial surface has a mossy or bearded appearance. In those of the authors' cases in which bone lesions were present, the disease was of the second or diffuse form. Bone erosion and formation of uniloculated and multiloculated cysts may be seen adjacent to the nodular soft tissue masses. The diagnosis of villonodular synovitis with or without bone lesions should be based upon the following criteria: monarticular involvement; normal preservation of the joint space; normal mineralization of juxtaarticular bone; nodular intraarticular synovial swelling; lack of calcification within the soft tissue masses; absence of systemic disease; chronicity, with duration of symptoms from several months to several years, with relatively little pain in the affected joint and little if any limitation of motion. The ætiology of villonodular synovitis is uncertain. Because a history of trauma or repeated trauma is frequently obtained, it has been suspected that chronic or repeated hæmorrhage within a joint may be responsible. The term chronic hæmorrhagic synovitis has been used to describe the diffuse form.

Anatomico-Spatial Changes seen in Lobar Collapse.

G. R. KRAUSE AND M. LUBERT (*Am. J. Roentgenol.*, February, 1958) illustrate the actual anatomico-spatial changes in cases of lobar collapse by means of three-dimensional models. By making these models of transparent and translucent plastic material, the effect of penetrating X rays could be simulated. The models could then be viewed from different angles and compared with skiagrams in different projections. For the normal or over-expanded lobes transparent "Plexiglas" was employed. When viewed from the front or side, one sees the white collapsed lobe through the transparent normal lobe, simulating the manner in which X rays penetrate the normal lobe, but the collapsed lobe casts a white shadow on the film. This report is illustrated by reproductions of perspective drawings of these models.

Radiological Diagnosis of Sex Based on Skull Measurements.

J. L. CEBALLOS AND E. H. RENTSCHLER (*Radiology*, January, 1958) made a radiological comparison of certain measurements of 100 normal adult male and 100 normal adult female skulls. These included sagittal diameter, mastoid length, mandibular width at the level of the mastoid tips and mandibular angle width. The comparison of the findings in these two groups shows that there are characteristic dimensions for the male and female and that sex can be predicted in 88% of cases by utilization of these dimensions. The authors consider that the findings might be of value to the anthropologist or in certain medico-legal problems.

RADIOTHERAPY.

Malignant Effusions.

M. L. JACOBS (*J.A.M.A.*, February 8, 1958) describes the use of radio-active chromic phosphate in the treatment of malignant effusions. In comparison with radio-active gold, it is simpler to handle, safer, and less expensive. Forty-one patients with malignant pleural effusion were treated, 60% of them with "good" results, 11 of the patients having periods of freedom of six months or longer. Of 16 patients with malignant ascites, 31% had "good" results. One serious consequence of treatment can be necrosis as a result of loculation of the radio-active material, so the author recommends that "if, in the process of paracentesis, it is evident that there is loculation, this must be considered a contraindication to the instillation of radio-active material".

Death After Exposure to Radiation.

E. PATERSON (*Brit. J. Radiol.*, November, 1957) discusses the mechanism of death after exposure to radiation. She states that during the period of the radiation syndrome the changes in the blood, however dramatic, are probably not the basic mechanism of death, but are an inevitable secondary consequence. Death, at the critical stage, may be precipitated by hæmorrhage or anoxia, or by the occurrence of bacteræmia. The prime cause of death seems to be the exhaustion of one or more stem cell types from the reticulum. Individual differences in the quality or quantity of this cell factor determine the individual sensitivity of the subject. Hibernation will postpone, but not prevent, the train of events. But replacement of this factor sufficiently early in the post-irradiation period can prevent the various changes. It would seem to be of the utmost importance to find the function or the identity of this cell type. This would not only give us a real understanding of the mechanism and treatment of total body irradiation, but might also enable us to understand some of those diseases of the reticulo-endothelial system in which bone marrow failure is a characteristic termination.

Carcinoma of the Bladder.

M. FRIEDMAN AND L. G. LEWIS (*Am. J. Roentgenol.*, January, 1958) describe a technique for treating carcinoma of the bladder by using a small central source of radium or Cobalt^{60} in a balloon catheter. This technique has been designed to irradiate the lower two-thirds of the bladder. Cystotomy is usually carried out at the time of insertion of the radiation source, so that bulky tumours can be shaved down by electro-surgery and the positioning of the radiation source accurately determined. The best results are obtained with multiple papillary carcinomata and the method is not suitable for lesions thicker than two centimetres. In the series of 50 patients treated between July, 1945, and April, 1953, the absolute five-year apparent arrest rate was 56%.

Medulloblastoma.

A. JONES AND G. S. INNES (*Brit. J. Radiol.*, November, 1957) state that the accepted method of treating a patient with medulloblastoma is to irradiate uniformly the cerebellum and brain stem, the cerebral hemispheres and the whole cerebro-spinal fluid pathway. In this article a new technique is described for post-operative irradiation of the cerebro-spinal axis for medulloblastoma in childhood. Pathological and clinical data indicate that a likely site of tumour recurrence is the posterior cranial fossa, and the method is an attempt at uniform irradiation of this region, while ensuring that the irradiation of cranium and spine may be accurately and safely apposed.

Special Article.

REHABILITATION: IV. THE PATIENT WITH A BACK INJURY.

It has been suggested that rehabilitation starts with the arrival of the ambulance at the scene of the accident, and is completed only when the individual is permanently resettled in a job providing maximum scope for his skills and capacities.

This is an important principle in every field of rehabilitation, but nowhere more essential than in the handling of patients with injuries of the back.

After a review of numbers of such patients who have been incapacitated for six months or longer, it becomes apparent that, if the early management were more thoughtful and treatment carried out according to a definite continuing plan, long periods of invalidism could be avoided, and the waste of money involved in loss of earning power, compensation and cost of medical care could be considerably reduced.

An attempt will be made to set out a plan of management beginning at the moment of the accident and leading back to employment.

There are certain basic principles in this management which should be clear to all those individuals concerned with the care of the patient from the moment of his accident: these include the first-aid man at his work, the ambulance transport service, the general practitioner who makes the initial examination of the patient, the consultant who sees him later, and also the nursing staff and members of the ancillary services. The approach to the problem must be concerned with the reconditioning of the whole man with an injury of the back and not merely with restoration of the patient to anatomical normality.

The basic principles important to the medical profession will be stressed in this article, but the detailed care of the fractured spine with its serious neurological complications will be reserved for another occasion. An accurate knowledge of the anatomy, physiology and mechanics of the back will assist in a method of history-taking and physical examination, both of the injured part and of the whole patient, which will be rapid and efficient, giving the objective data so essential for a satisfactory assessment of progress. After these details have been ascertained and carefully recorded a positive diagnosis should then be possible with the aid of the X-ray findings.

If the general practitioner is satisfied with the diagnosis at this stage, he should map out a course of management with the cooperation of the patient and his relatives; this he should review at the end of four to six weeks if the symptoms are relieved and clinical signs are progressing satisfactorily. If they are not, a consultant's opinion should be sought in the early stages. The consultant should be acquainted with the medical details, which should have been accurately recorded at the first interview; these are likely to be the true facts. As well as these, the social and vocational details should be added, so that he is aware of the components of the patient's work—e.g., the ladders he must climb, the amount of bending he must do, the weights he must lift, etc.

With these details available a further plan of management should be decided at consultant level and reviewed at regular intervals. If operation is indicated, it should not be unnecessarily delayed, because the patient's mental and physical state deteriorate rapidly with pain and the uncertainty of the future enhanced by the depression caused by analgesics. The plan should include a regime designed to keep the mind occupied and the unaffected limbs, as well as the spinal muscles, in good condition while the anatomical abnormality is being treated. The goal of all programmes is to return the patient as quickly as possible to his own occupation if possible.

The most serious gap in treatment observed at present is in that of the patient who is sent to the city from the country for consultant opinion and care. He may or may not receive physical medicine; but when he returns home there are no facilities, and his own doctor is at a loss to find means of keeping him in a fit condition. Rehabilitation centres with access to suitable accommodation outside the hospitals, treating the patients as "day cases", are very successful at this stage.

The mechanics of the back have been altered as man has assumed the upright position; the lumbar curve has changed its direction and has been forced to withstand great stress in the course of ordinary everyday work. The structures which maintain the integrity of this area, the bones, ligaments, muscles and covering soft tissues, can function efficiently only if they are in normal alignment and have a satisfactory blood supply and nerve supply; if this alignment is allowed to remain disturbed for a long period, especially in a plaster cast that is proving inefficient, the resultant damage is sometimes irreparable. The natural processes of repair cannot be hurried, but it is very easy to delay them; no amount of rehabilitation can compensate for lack of judgement in the initial treatment.

History and Physical Examination.

A detailed method of history taking and physical examination is set out as a guide to the requirements necessary to establish the diagnosis.

History Taking.

A general history of past accidents and illnesses with a particular history of the present complaint is important. It is the doctor's business to determine why the back aches or is deformed, and how to relieve the complaint, and to consider it as having an organic basis until definitely proved otherwise.

Present Complaint.—Its type, location and time and manner of onset should all be ascertained. Here may I stress again that in dealing with compensation cases the noting and recording of these initial details is of extreme importance and should not be overlooked. The history of accident given by the patient at the time of the first examination is the true one. Is pain continuous or intermittent? What seems to bring on attacks? Is it fixed or migratory? How is it affected by rest, posture, activity and heat? Has there been a previous attack? Also, has there been a recent illness, injury, emotional disturbance or mental or physical fatigue? What have been the functions of the gastro-intestinal, genito-urinary, cardiac and respiratory systems?

Physical Examination.

A detailed physical examination, starting with the back, has been found to offer a better psychological approach than the ordinary routine performed system by system. The patient who has a severe pain in the back gains confidence if he thinks that the examination is concentrated on the area affected, but the general physical examination should never be forgotten.

Proper examination demands that the back should be bare and visible from head to foot. The examiner sits with his eyes level with the thoracic area and far enough away to gain a full perspective of the whole back movement. The technique of inspection, palpation, percussion and auscultation is observed.

Inspection.—The landmarks to be noted are the spinous processes, scapular angles and posterior iliac crest and spines. The following factors are observed and recorded: general development and state of nutrition, condition of skin and body hair, symmetry of neck, torso, shoulders, buttocks, thighs, legs and feet, curves of the back and contours of the muscles, scoliosis, lumbar flattening, rigidity. The patient is asked to point out the areas of pain and tenderness. These are marked with a pen, and the procedure is repeated at the end of the examination. The patient's mobility in sitting, standing, dressing and undressing is noted.

Palpation.—This discloses areas of tenderness, trigger points, hyperæsthesia and tender masses, nodules and muscle spasm. Malalignment of structures and areas of crepitation and abnormalities are carefully recorded.

Auscultation.—This is important in differentiating between pleural friction and fibrous crepitation.

Movements.—It must be remembered that there is but little movement between individual vertebræ, but movement of the whole spinal column is considerable. It varies with age, weight and habitual activity. The normal back movement takes place in various arcs without sharp angles, muscle spasm or pain.

Forward bending with extended knees is recorded by noting the distance from the toes at which one finds the finger tips of the hand in full extension.

Lateral bending is recorded by noting the distance to which the finger tips extend below the knee in extreme lateral flexion to left and right.

Backward bending and its extent and rotation are also noted. If any abnormality is detected, the patient repeats the movements seated on a backless stool, to eliminate the

effects of lesions of the hip joints, of the fascia lata, and also of the sacro-iliac joints and the sciatic nerve. To demonstrate lesions of these structures the patient should lie down on a firm table, the best test being straight leg raising. This manœuvre brings stress either upon the sacro-iliac or lumbo-sacral joints or upon the sciatic nerve. Abnormalities should be recorded as the angle between 90° and full extension at which pain occurs. While the patient is in this position shortening of the extremities is determined, and observation is made of hip movement, knee flexion, the state of the feet and sensory changes.

General Physical Examination.—This should be carried out while the patient is in this position, and he should sit up for the eliciting of knee jerks and ankle jerks. The importance of pelvic and rectal examination must not be forgotten, especially when the affecting agent is not traumatic.

If the patient is in great pain or has suffered serious injury, then examination should be carried out with him in the prone position, but it cannot be as full as necessary.

Diagnosis.

To establish a positive diagnosis the correlation of the history and physical signs with the results of X-ray examination is necessary. X-ray examination is indicated for all except the simplest injuries, and the instructions to the radiologist should be specific and should state a presumptive clinical diagnosis to assist the radiographic technician in positioning the patient. The interpretation of symptoms and clinical and X-ray findings will lead, as previously stated, to accurate diagnosis.

If the back was painless previously, and the onset of pain was referable to some particular incident of sudden snap, catch or sensation of giving way while the patient was bending or lifting, the diagnosis is failure of ligament, bone or muscle to withstand the stress applied to it. Such injuries are immediately accompanied by muscle spasm, with inhibition of motion and deformity. Pain appearing without injury, increasing and becoming more disabling, may be attributed to an inflammatory or arthritic basis. The possibility of malignancy, either primary or secondary, should never be forgotten.

One has to determine, if the condition is traumatic, whether it is a strain, i.e., tearing of muscle, or a sprain, i.e., tearing of ligaments, or whether it is deeper, with injury to bony structures or lesion of an intervertebral disk. A severe back strain causes much immediate pain, which may radiate greatly and confuse diagnosis. The immediate treatment is bed rest and sedatives. Complete review should be made when the acute stage settles.

Management.

Further management depends on accurate diagnosis and should be fully explained to the patient. The same principles of treatment apply as in injuries of the limbs—namely, (*a*) support and restriction of weight-bearing, with relaxation of muscle and ligaments to promote healing; (*b*) control of extravasation of fluid into the tissues.

Optimum healing of any laceration under the best circumstances requires at least three weeks; under poor conditions it may require much longer. Sending patients back to work too early causes many complications and leads to months instead of weeks of lost time. However, prolonged inactivity is equally bad.

Where there are frank signs of disk involvement with neurological complications, a consultant's opinion should be sought at once to determine the procedures to be adopted.

The objectives in early management are: (i) to maintain the power of the spinal muscles; (ii) to keep all the other muscles of the body as fit as possible. This can be achieved by general and specific exercises with useful activities.

If it is necessary to apply a spinal jacket, exercises should be begun immediately to keep all spinal muscles fit, and to prevent hypotonus of abdominal muscles. When the jacket is removed, the patient should have graduated group exercises. Preliminary exercises are designed: (i) to correct and maintain posture; (ii) to restore spinal mobility; (iii) to restore normal muscle power and rhythm.

It is necessary to make the patient posture-conscious and encourage him to be active—e.g., with ball games. Attention should be paid to his breathing in relation to posture. As he progresses he can be transferred to a more advanced group for: (i) complete mobilization of the spine; (ii) the regaining of strong muscle control; (iii) testing in a work situation to estimate his work tolerance, which should be built up to eight hours daily before he is returned to work. If this last assessment is not carried out, he will fail and return discouraged and mentally upset.

With all these precautions the patient with simple sprain or strain should return to work in four or five weeks fit and able to carry on with no residual disability. If he is suffering from a disk lesion and a plaster jacket is deemed necessary, his symptoms should be evaluated before application of the jacket, and again on its removal or at the end of six weeks. If they are not lessened, a further programme of treatment must be worked out at once and a decision made about surgical intervention and about the necessity for a myelogram or discogram. If the pain persists after the plaster jacket is applied, the jacket should be removed early. Nothing is more devastating than to persist for week after week with ineffective treatment.

At this stage a knowledge of all the facts, medical, social, vocational and psychological, will assist in the decision to be made. If the psychological state is not satisfactory, a psychiatrist should investigate the patient and try to uncover any preexisting psychiatric state. Failed treatment on the part of the doctor should never be regarded as an excuse for a diagnosis of neurosis. All factors causing anxiety, including financial and domestic difficulties, should be put in order before committing a patient to surgery and forced inactivity; time spent thus will be more than caught up later.

All parties concerned in the evaluation should be entitled, for the patient's safety, to full details of all the facts that have been ascertained before they can give an opinion. As the law stands at present, a patient can be subjected to examination by numerous doctors acting for one side or another in a legal argument, and the full facts are not always available to any one of them. We doctors are concerned with the patient's welfare; all consultations should be full-scale ones, including a social and work history, and we should pool all opinions of members of the team. Trained nurses, physiotherapists and occupational therapists are accurate observers and see the patients when they are relaxed and during their periods of therapy; their opinions have been found to be most valuable in a full assessment of mental and physical factors.

The malingerers are few, and every effort should be made to determine the diagnosis of the patient with true organic pain. To treat the condition as organic until definitely proved otherwise is the correct method. It is important to note that exaggeration is much more prevalent than malingering; it is caused by fear and leads to refusal to put up with discomfort.

Always have a goal and keep revising it at stated intervals, remembering that in the State of New South Wales there is very little light work; also that without proper conditioning no patient will remain at his work, and failure is disastrous. If you are unacquainted with the components and physical requirements of a patient's job, it is necessary to seek them; the particular industry concerned will be quite willing to supply them. A fit patient with an eight-hour-day tolerance, five days a week, able to transport himself to and from work, with settled domestic conditions, is the only one who will remain contentedly in a job.

Conclusion.

My remarks are based on observation of a great number of patients with pain in the back, due both to disease and to injury. For the past three years I have had the privilege of attempting to rehabilitate some very sad, discouraged patients who have experienced a haphazard approach by a number of qualified people each working alone. The over-all results are not to be compared with those in other parts of the world where the team approach is recognized and works efficiently.

Sydney. M. Naomi Wing.

Medical Societies.

PÆDIATRIC SOCIETY OF VICTORIA.

A meeting of the Pædiatric Society of Victoria was held at the Royal Children's Hospital, Melbourne, on April 9, 1958.

Microangiopathic Thrombotic Hæmolytic Anæmia.

Dr. M. Robinson presented the case of a male child, aged 21 months, who was admitted to the Austin Hospital, Mel-

bourne, with a one-week history of malaise, anorexia, fever and a suggestion of pain, tenderness and mild swelling of both wrists and ankles. Six days prior to admission a red blotchy urticarial rash had been noted over the diaper area, but this had faded after three days. On physical examination he was flushed and uncooperative. The temperature was 104° F., the pulse rate 164 and respiration rate 28 per minute. A fine purpuric rash diffusely involved the face and both upper extremities. Both wrists were swollen and tender, and movement was restricted by pain. A mild tonsillitis and otitis media were present. A provisional diagnosis of anaphylactoid purpura of the Schönlein type was made and he was treated with aspirin and observed. However, the temperature continued to swing up to 104° F. each day for several weeks. During this period numerous investigations were performed. His blood examination showed the hæmoglobin level to be nine grammes per 100 millilitres (60%); the white cell count was 20,000 per cubic millimetre, with 70% neutrophils, 25% lymphocytes, and 5% monocytes, the neutrophils showing a marked "shift to the left". The red cells and the platelet count were normal. Other investigations performed and found normal were: Paul Bunnell test, Coombs test, blood cultures, agglutination tests, Casoni tests, Wassermann and Kahn tests, liver function tests, blood urea and serum protein estimation, cerebro-spinal fluid examination, examinations for "L.E. cells" and malarial parasites, analyses and microscopic examination of urine.

Apart from the development of a slightly enlarged spleen and an intense leucocytosis, nothing further developed. After three months in hospital his temperature subsided spontaneously, and he became quite well and was allowed to go home. Six months later he was admitted with similar symptoms and a high temperature. At this stage his hæmoglobin level was 11 grammes per 100 millilitres (74%) and white cell count 24,600 per cubic millimetre, with 60% neutrophils, 4% eosinophils, 33% lymphocytes and 3% monocytes. The reticulocyte count was 12% and the platelet count 100,000 per cubic millimetre. The serum bilirubin level was 3·2 milligrammes per 100 millilitres, the urinary urobilinogen was markedly increased, and the fæcal sterco-bilinogen excretion per day was 300 milligrammes. His white cell count gradually rose to 56,000 per cubic millimetre, and the hæmoglobin level waxed and waned in association with a fall and rise in the reticulocyte count. A combined axillary lymph node and pectoral muscle biopsy was taken because of the suspicion of thrombotic microangiopathic hæmolytic anæmia. The histological findings which Dr. Orchard would discuss confirmed the diagnosis.

It was decided to commence cortisone therapy, and he was given initially 25 milligrammes of cortisone acetate twice daily by mouth. The improvement was dramatic; his temperature subsided in ten hours, and although occasionally elevated in the next two weeks, this was never above 100° F. When the dose was increased to 50 milligrammes given twice daily the temperature remained completely normal. Equally dramatic was the clinical improvement: he became cooperative, his appetite returned, and he wanted to get out of his cot. Prior to this he had been miserable and inconsolable. With 50 milligrammes twice daily he developed features of Cushing's syndrome, so prednisolone, five milligrammes given thrice daily and later five milligrammes twice daily, was substituted for cortisone acetate. Since that time he had required five or ten milligrammes of prednisolone daily—his mother had learned from his general demeanour and from his temperature chart (which she had kept assiduously) how much cortisone was required. The constant aim had been to stop cortisone therapy, but so far no further remission had been obtained. Clinically, however, he was very well indeed and physical examination revealed no abnormality.

The first example of the syndrome of thrombotic microangiopathic hæmolytic anæmia had been described by Moschowitz in 1924 and probably no more than forty proven cases had been reported since. According to Symmers and Barrowcliff (1951) it occurred in both sexes at any age. Very few cases of the syndrome occurring in children had been reported, and the youngest patient whose case had been recorded was 22 months old (Craig and Gitlin, 1957). The onset was usually sudden, and typically it was characterized by fever, purpura and hæmolytic anæmia. Multifarious fluctuating neurological disturbances often occurred terminally and were of little diagnostic consequence. Abnormal laboratory findings included a thrombocytopenia, and an anæmia, often associated with a raised reticulocyte count. Leucocytosis was usual and might be leukæmoid in type. The bleeding time was prolonged and clot retraction defective, but the coagulation time was usually normal. All patients reported to date had died, two-thirds of them in six weeks or less. Examples of prolonged course were few, the longest being that of a young man reported by Brown and Norman in 1946. Another case running a course of three and a quarter years was reported by Meacham *et alii* in 1951.

The case presented was of interest for several reasons. The patient was the youngest on record; the mode of presentation, although acute, was by no means fulminating; the illness had been protracted; and frank neurological signs had been absent from the start, although there had been marked personality change consisting of extreme misery and complete lack of cooperation, even after months in hospital.

DR. N. ORCHARD discussed the pathology of the condition. He said that the lesions in this syndrome were widely disseminated, and confined to the smallest calibre vessels. They occurred more frequently and were more numerous in the myocardium and in the capsular zones of the adrenals and of the renal cortex. They consisted of occlusion of the arterioles and sometimes rupture of the wall with subsequent hæmorrhage; there was no cellular reaction. Recanalization of the thrombi, endothelial proliferation and subendothelial accumulation of hyaline material might also occur. There had been in the past much speculation as to the exact nature of the occlusive thrombi, which had been generally accepted to consist of agglutinated platelets. Craig and Gitlin in 1957, using fluorescein-labelled rabbit anti-human fibrin serum, showed the thrombi to consist of fibrin and failed to demonstrate the presence of platelets in the thrombi.

Combined muscle and lymph node biopsies had been performed in the case presented. Sections of the muscle showed no abnormality and the lymph node showed only reactive hyperplasia, but striking vascular changes were seen in the pericapsular region. There was a hyaline thrombus in the lumen of one of the larger arterioles; a portion of its wall had ruptured with subsequent hæmorrhage, but there had been no cellular reaction. Some vessels were thrombosed and a few showed the clefts of recanalization; endothelial proliferation was evident.

Evidence of hypersensitivity had been recorded and was also shown in this case. Sensitivity to sulphonamides and reactions to iodine compounds and to penicillin had been recorded. Many considered this syndrome to be related to the collagen diseases. The symptomatology in this case closely resembled that of disseminated lupus erythematosus; L.E. cells were looked for repeatedly, but had not been demonstrated. Verrucous endocarditis and lupus erythematosus had been reported in association with thrombotic microangiopathy. Symmers and Gillett had reported a case of polyarteritis nodosa in which the widely disseminated lesions of thrombotic microangiopathy were also present. Beigelman's concept of the ætiology of disseminated lupus erythematosus, polyarteritis nodosa and thrombotic microangiopathy was that of a hyperergic response occurring in different layers of the vessel wall, a maximal response occurring in the perivascular mesenchyme giving rise to disseminated lupus erythematosus, a maximal response occurring in the media giving rise to polyarteritis nodosa, and a maximal response occurring in the intima giving rise to thrombotic microangiopathy.

The names given in the past to this syndrome had been both numerous and unsatisfactory. Some stressed the thrombocytic nature of the occlusive thrombi and others the thrombocytopenia; all lost sight of the characteristic hæmolytic anæmia. Symmers in 1952 suggested the title "thrombotic microangiopathic hæmolytic anæmia", or, for short, "thrombotic microangiopathy". This was descriptively accurate and wisely omitted controversial and inconstant features.

DR. H. WETTENHALL said that the patient had been under his care at the Austin Hospital for two months in 1955. Despite numerous investigations no diagnosis had been established. Significant clinical features were the purpuric rash and lymph gland enlargement. The patient also had a high swinging temperature and, as he had been fed on unpasteurized milk, brucellosis had been considered. When seen in April, 1957, the patient had been quite well. He was receiving prednisolone continuously apart from periodic attempts at withdrawal. The dosage was minute, at one stage being only 2·5 milligrammes of prednisolone daily, which was less than the equivalent amount of hydrocortisone produced daily by the normal adrenal. Dr. Wettenhall regarded the case as another example of collagen disease and thought that the patient might make a complete recovery.

DR. I. EPSTEIN said that he had had experience of only one similar case. This was a female patient, aged eighteen years, who exhibited the classical triad of hæmolytic anæmia, thrombocytopenic purpura and neurological disturbances. Despite cortisone and splenectomy, this patient had died,

as had all other recorded cases; none had ever shown a significant response to cortisone. The case under discussion was therefore not classical. Its "pigeon hole" was halfway between thrombotic thrombocytopenic purpura and polyarteritis; most probably it constituted a syndrome all of its own.

DR. J. COLEBATCH asked whether there was any personal or family history of allergy; whether in the recorded cases antibodies had been found against either white cells or platelets; and whether disseminated lupus erythematosus could be excluded, as L.E. cells were less frequently found in children than in adults. He did not think the dose of prednisolone used was insignificant, as it was equivalent to an adult dosage of 62·5 milligrammes of cortisone.

Dr. N. Orchard, in reply, stated that the distinctive histological picture in this case excluded both lupus erythematosus and polyarteritis.

Dr. M. Robinson, in reply, stated that the patient had a history of "hives", but that there was no family history of allergy. Agglutinins had not been found in the cases described. The thrombi present in these cases were not composed of platelets.

Laryngo-Tracheo-Bronchitis due to Influenza (Asian Type A).

DR. J. FORBES, discussing laryngo-tracheo-bronchitis due to influenza, said that the influenza (Asian Type A) epidemic in Melbourne, which had provided large numbers of patients in a short period of time, demonstrated clearly some of the relatively infrequent, more severe effects of influenza virus infection. Six hundred and seventy-two patients with disease attributable to this epidemic of influenza were admitted to Fairfield Hospital during July and August, 1957. These were mainly the more severe and complicated cases of the epidemic, which presented in three main clinical groups and were diagnosed as influenza, obstructive laryngo-tracheo-bronchitis and pneumonia. The relation of these cases to the epidemic was established by their associated increased incidence, clinical details and the isolation of the influenza virus (Asian Type A) from throat washings of sample groups. In 169 cases the diagnosis was uncomplicated influenza; 127 patients had moderate or severe laryngeal obstruction, whilst 376 had bacterial pneumonia.

Of the 127 patients admitted with moderate or severe laryngeal obstruction, 75% were aged nine years or less, whilst 61% were less than five years of age. There was a predominance of infants, and in these the laryngeal obstruction was often severe and prolonged. The occurrence of such a large number of cases of laryngo-tracheo-bronchitis was an unexpected feature of the epidemic and suggested that this represents a common mode of presentation of influenza in infants and young children. The divergence of the age incidence curves of influenza and laryngo-tracheo-bronchitis in the early age groups lent weight to this suggestion. The onset of the disease in this group was characterized by hoarseness and a croupy cough associated with fever, followed by stridor, which in many cases developed within twenty-four hours. The white cell counts of these patients were either normal or low, with a predominance of lymphocytes; this was unlike those seen in bacterial laryngo-tracheo-bronchitis which were commonly high, with a predominance of polymorphonuclear cells.

Influenza A virus was isolated from a sufficient number of the patients to confirm the ætiology of the condition, and the majority were uncomplicated by bacterial infection. Whereas in the usual bacterial laryngo-tracheo-bronchitis stridor improved with antibiotics after from one to three days in a steam tent, in these cases the laryngeal obstruction was prolonged and stridor often persisted for periods of five days. The course of the illness was unaltered by antibiotics.

It is not surprising that evidence of laryngeal obstruction was almost confined to infants and young children, in whom the airway was small and therefore likely to be impaired by the inflammation and œdema produced by a pathogen with a predilection for respiratory epithelium and lymphoid tissue. It seemed likely that influenza in young children might well predispose to secondary bacterial laryngo-tracheo-bronchitis and accelerate the development of complete obstruction. In the older age groups hoarseness was a fairly frequent accompaniment of the infection, but no difficulty in breathing occurred in the vast majority of these patients.

Dr. H. McLorinan had pointed out to the speaker that during the 1919 influenza epidemic many patients of all ages died with hæmorrhagic tracheitis, which appeared to be akin to this syndrome. The fact that in 1957 laryngo-tracheo-bronchitis had occurred in pronounced form only in young children suggested that the 1957 infection was less severe. The syndrome nevertheless demonstrated the potentialities of influenza virus infection even when uncomplicated by bacterial infection.

MR. I. JACK said that one hundred and sixty-four cases of laryngo-tracheo-bronchitis had been admitted to the Royal Children's Hospital during the preceding year. Less than half of these cases had occurred during the influenza epidemic. In the summer months there had been a ten to one preponderance of male children, but in the winter months this preponderance of males had been very slight. He therefore thought that there must be two groups of cases, one due to influenza and one due to other viruses.

MR. P. JONES asked what had been the incidence of tracheostomy in Dr. Forbes's cases.

DR. J. COLEBATCH asked what had been the mortality.

Dr. J. Forbes, in reply, stated that there had been no deaths from laryngo-tracheo-bronchitis, although deaths had occurred from pneumonia during the epidemic. The pneumococcus had given rise to the greatest worry. In the whole group secondary infection had been due to the staphylococcus in only twenty cases. Group A streptococci were the second most common secondary invaders.

Severe Bleeding from the Ear.

MR. A. CLARKE discussed the syndrome of severe bleeding from the ear as a result of a lesion of the carotid artery, and MR. N. MYERS presented the clinical details of a child suffering from this condition. This paper and report of case will be published separately at a later date.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

TUBERCULINE.[1]

[From the *Australasian Medical Gazette*, April, 1891.]

THE Department of Public Lands desires it to be known that as much interest has of late been manifested in the question of the application of Dr. Koch's lymph "Tuberculine", it may not be out of place to mention that the Animals Infectious Diseases Act of 1888 makes it unlawful for any person not holding a licence from the Minister for Lands to introduce into this colony, or to receive when introduced, or to keep, or to distribute any microorganism, mite, or parasite, or other minute form of life (existing otherwise than in a state of artificial cultivation) capable of producing any disease or pestilence in man, or in any wild or domestic animal, or any substance or medium impregnated therewith. An offence against this Act is declared to be a misdemeanour, and any person offending is liable to imprisonment or to be fined. The Act, however, also stipulates that nothing in it shall be held to apply to the introduction or use of any lymph or other substance existing otherwise than in a state of artificial cultivation, or method for preserving vitality thereof.

Correspondence.

CANCER OF THE UTERUS.

SIR: Your leading article of May 24, 1958, has performed a much needed service in pointing out the proven value of exfoliative cytology in detecting both invasive and pre-invasive carcinoma of the cervix, even where there are no clinical signs of cervical disease. It is the detection of unsuspected carcinoma by means of this procedure which should be emphasized. The natural history of carcinoma-in-situ in not yet fully known, and until it is shown to be an innocuous lesion, it can only be regarded as the precursor

[1] From the original in the Mitchell Library, Sydney.

of an invasive tumour. The detection of occult carcinoma-in-situ is therefore of the utmost importance.

It is now impossible not to maintain a cytology laboratory in most United States hospitals. So much publicity has been given to the "Pap" smear by now that the public demands this examination and this demand can no longer be resisted. The smear is now a part not only of all gynæcological examinations, but also is incidental to many physical examinations for disease of other systems. Many pathologists, myself included, have of necessity been slow to introduce this technique on a large scale, mainly because of the great shortage of "screeners". This dearth of "screeners" is in turn related to the tedium of the work; many technicians, having received the necessary special training, have shortly afterwards given up the work in order to return to routine pathological technology. To meet this shortage, a few United States universities will train persons with no grounding in the biological sciences to become "screeners"; but most schools prefer technicians or science graduates already certified in pathological technology.

Because of the above-mentioned exacting and tedious nature of the work, I have preferred to select a well-experienced and certified laboratory technician and send her to the University of California for the four months' course, at the hospital's expense, so that she would receive a full and formal training as well as a reputable university certificate. It seems preferable that the technician be trained by a reputable school rather than that she should "learn as she goes", because the latter procedure might result in a dangerously high percentage of false negative reports, such errors perhaps not being recognized for a number of years. To offset the difficulty in recruiting cytology technicians, the job should be made as attractive as possible and a degree of importance attributed to it. It may be necessary to limit the number of hours of microscopy and to pay a slightly higher salary than the "going rate". Some screeners do the work at home on a part-time basis; but this is an unsatisfactory arrangement.

In the first four months of 1958 our newly trained technician has examined the smears of 1060 cases and reported 11 as being positive or suspicious. Of these 11 cases, nine have been proven to have carcinoma of the cervix by biopsy, five being still pre-invasive and asymptomatic. These figures are a small beginning, but are consistent with those reported elsewhere in the nation. As this technician has now reached her limit of 3000 cases per year, we are encouraged to send a second girl for training in the University of California, this time perhaps with the financial assistance of the National Cancer Institute.

This short personal experience in routine uterine exfoliative cytology has convinced me of its value in the early detection of cervical carcinoma, especially since most early tumours are situated out of sight in the endocervical canal. It is recommended as a routine procedure, but only after a suitable number of fully and formally trained technicians are available. It cannot be done part time as a sideline by the pathologist himself. It would seem that the training of screeners must be done by the universities or approved hospital laboratories affiliated with the university, possibly with national or State financial grants.

Yours, etc.,

C. E. Marshall.

Seattle,
Washington,
U.S.A.
July 29, 1958.

TRAUMATIC RETROPERITONEAL HÆMORRHAGE.

Sir: This case is reported because it is the first which I have seen of its kind, and I can find no description of the condition in any text-book, though it would be expected to occur fairly frequently as the accident leading to it must surely be common. Attempts made by a medical library to trace similar cases for me in the literature have failed.

A boy, aged two and a half years, was admitted in the afternoon with a history of having fallen down on his abdomen at nine o'clock that morning. There was a large stone on the ground at the spot where the abdomen fell.

On examination, the temperture was 99·2° F. and the pulse rate 120 per minute. There was fullness of the whole of the right side of the abdomen with tenderness and a dull percussion note.

The patient was put to bed with two pillows and given water only by the mouth. An hourly pulse was taken. At 9 p.m., as no urine had been passed since the accident and there was some doubt about the bladder having been injured, a fine rubber catheter was passed. Clear urine was withdrawn. Next day the pulse rate rose to 132 per minute and there was an increase in the tenderness and distension. The patient vomited once. He was extremely restless. A diagnosis of intraabdominal hæmatoma was made.

Laparotomy was performed under ether anæsthesia. The object was to discover whether there was any active hæmorrhage, and if so, to deal with it. A mid-abdominal right rectus split incision was made. An extensive extravasation of blood was found in the retroperitoneal tissues of the posterior abdominal wall over almost the whole of the right side of the abdomen, especially behind and lateral to the caecum and ascending colon. Aspiration with a wide-bore needle was attempted, but nothing was evacuated, the blood evidently having clotted. The appendix was normal and small. The small intestine, transverse colon, liver and right kidney were normal. The caecum and ascending colon were discoloured posteriorly, and blood was extravasated into the mesentery of the caecum. As there was no active hæmorrhage the abdomen was closed without drainage. Recovery was uneventful and the child remained well afterwards.

It seems probable that the hæmorrhage was from a tributary of the renal or one of the colic veins.

Yours, etc.,

S. V. Humphries, M.A., M.R.C.S., L.R.C.P.

Nauru,
Central Pacific,
July 21, 1958.

ENDEMIC GOITRE.

Sir: Your leading article on the "Renewed Interest in Endemic Goitre" of July 19, 1958, is most pertinent. It is indeed "justifiable to raise the question whether endemic goitre is a single clinical entity or whether it is not a number of different conditions produced by different ætiological factors. . . ". It is now nearly forty years ago that McCarrison likened these goitres to fever—but since then the benefits of iodine, undoubted but far from untold, have served to let prophylaxis obscure, not elucidate, the ætiologies. It may well be that McCarrison will receive the accolade of posthumous rehabilitation, and perhaps even that that argumentative epidemiologist, Dr. Greenwald, will survive to be awarded the golden halo and not the cloven hoof.

Yours, etc.,

S. F. McCullagh.

Finschhafen,
Territory of Papua and New Guinea,
July 28, 1958.

APHTHOUS ULCER.

Sir: So that very complicated biochemical product hydrocortisone is now added to the long list of treatments for aphthous ulcers of the mouth; a truly Heath-Robinson structure with which to attack so small an ill! Will my learned brothers scorn a simple cure, as Naaman[1] scorned to treat his dirty dermatitis with seven baths in Jordan's running water?

Recipe: Take thou a cake of (e.g. "Velvet") household soap. Let the cake be wet. Apply the pad of a finger to the softened underside. Anoint the ulcer with this soft emulsion. Count ten. Rinse with *aqua tepida*. Pain disappears. A second application may be necessary. Healing is rapid. There are no known complications.

Yours, etc.,

Gwenneth Wisewould.

High Street,
Trentham,
Victoria.
July 30, 1958.

ACUTE HÆMATURIA.

Sir: I wish to report for my colleagues six cases of acute hæmaturia of which four were in my own practice. All presented as hæmaturia following some three to four days after a mild insignificant fever. The majority cleared in three to four days. One persisted and has since developed

[1] II Kings, v: 10.

granular casts—three weeks after onset. He is pale but otherwise well. The profuse character of the symptomless hæmaturia is rather surprising. I suppose it must be due to some acute nephrotropic streptococcus.

Yours, etc.,

2 Pembroke Street,
Epping,
New South Wales.
July 30, 1958.

N. F. BABBAGE.

Obituary.

ARTHUR SCHÜLLER.

WE are indebted to Dr. Frank Morgan for the following account of the career of the late Professor Arthur Schüller.

The death of Professor Arthur Schüller, of Vienna (in St. Vincent's Hospital, Melbourne, on October 31, 1957), brought to an end a world-renowned career and a medical era. He lived through three periods of world and medical history. His eighty-two years encompassed the events before World War I, when Viennese and Austrian prestige were at their height; those during World War I and the uneasy and difficult years to 1939, when poverty, famine and inflation and the threat of Nazism largely destroyed the glories he had known; and finally those of World War II and its aftermath—the Australian phase of his career.

During each of these periods he made outstanding contributions to medical research and teaching in the fields of röntgenology of the nervous system, neurology and neurological surgery.

Arthur Schüller was born in the city of Brünn, Czechoslovakia, in 1874. His father was a doctor, a specialist in diseases of the ear, nose and throat, and a friend of Politzer. School-day studies were attended with special honours in art, humanities and music. He was always at the top of his class, and this was a feature of his subsequent career in medicine, which began in Vienna at the age of seventeen. Graduation came with the highest honours—*sub summis auspiciis imperatoris Francesci Josephi*—the prize awarded by Emperor Franz Joseph for outstanding merit. This prize was presented at a special audience with the Emperor and was given only twice during the sixty-year reign of Franz Joseph. Its material form was a setting of diamonds on a background of black amber. This the professor left in Vienna in 1938. "I will leave it for Hitler", he said, preferring to retain the distinction which it signified.

Professor Schüller's graduation took place soon after the discovery of X rays by Röntgen, of Wurzburg, in 1895. He was attracted to the study of this revolutionary development in medical science and was introduced to its practice by Holzknecht, the founder of the Viennese School of Röntgenology. Meeting Schüller one day in the grounds of the Allgemeine Krankenhaus, he said: "Come, little Schüller, come and join me in the Röntgen Department." Thus began an association which was destined to bring fame to the School of Röntgenology and to the young apprentice. Holzknecht did not mean that Schüller was a little man in the physical sense—for he was a tall erect figure, having handsome features and a fine head, crowned in later years with magnificent white hair—but that, as yet, the development of Schüller's intellectual powers was slight in comparison with what he predicted and hoped. Holzknecht's judgement was soon justified. In 1905 Schüller published *"Die Schädelbasis im Röntgenbilde"*, and in 1912 *"Röntgen-Diagnostick der Erkrankungen des Kopfes"*. These were monumental works whose fundamental principles still form the basis of X-ray examinations of the skull. His efforts brought him recognition as the pioneer of röntgenology of the skull, so that in later years he was hailed by his Austrian colleagues as *"der weltbekannte Begründer und Altmeister der Schädel-Röntgenologie"*. This was in 1949, when he contributed an original paper to *Radiologica Austriaca*, *"Über seltene pathologische Röntgenbilder"*, the results of his continuing research in my clinic at St. Vincent's Hospital.

His fertile and versatile mind led him to other fields. In *Wiener Medizinische Wochenschrift*, Number 39, 1910, he published a paper, *Über operative Durchtrennung der Rückenmarksstränge (Chordotomie)"*. Thus was introduced the operation of antero-lateral chordotomy, which is employed today with excellent success for the relief of pain. This was the forerunner of other tractotomy operations, e.g., in the medulla (Sjöquist, Schwarz and O'Leary), in the pons (Dogliotti) and in the mesencephalon (Earl Walker), performed at higher levels and with similar purpose. It is true that the first antero-lateral chordotomy performed on man was carried out by Martin, of Philadelphia, on the recommendation of Spiller. But the original experiments on dogs, and the conception of the operation, are due to Schüller.

In association with Erdheim he made studies of pituitary tumour and of the measures for the relief of this malady. He "commanded" Hirsch (Schüller's own word) to operate for this lesion by the nasal approach across the sphenoidal sinus, the trans-sphenoidal operation. "Command" was the word the professor used in conversation about his part in this operation. It does not signify a harsh order, but means a polite request to his colleague to assist in the relief of pituitary adenoma. Schüller always claimed this to be one of his three operations—antero-lateral chordotomy is the second; the suggested posterior cisternal drainage of the hydrocephalic third ventricle ("Posterior Third Ventriculostomy", *Surgery*, July, 1948) is the third. The trans-sphenoidal operation is still carried out by Hirsch, now in Boston, U.S.A., with great dexterity and skill, and with excellent results in properly selected cases.

These and other diverse interests of Schüller, e.g., neurology studied under Nothnagel, and psychiatry under Krafft-Ebing and Wagner Jauregg, laid him open to the criticism of his colleagues that he was diluting his powers by this widespread application of his intellect. However, this was his method, and none can say it lacked success. We shall see that he described, as well as three operations, three diseases of bone.

Meantime fortune smiled on him. In 1909, at the age of 35 years, he became University Professor in Vienna, and an acknowledged leader in the greatest medical school in Europe. Among his colleagues were Billroth, Albert, Nothnagel, von Eiselberg, Finsterer, Politzer, Neumann, Hochenegg, Holzknecht, Krafft-Ebing and Wagner Jauregg. He possessed independent means far in excess of his needs. Hence his colleagues sent him the most difficult and unremunerative cases.

Then came World War I with its distractions and much medical work for the Army. Notwithstanding, he described in 1915, under the title *"Über Eigenartige Schädelfedte im Jugendalter"*, the disease now named Schüller-Christian.

Post-war Vienna was not the happy care-free city of the times of Franz Joseph. Famine, poverty and want racked the once prosperous centre of continental art and culture. Schüller's fortune disappeared in the desperate inflation which ensued. To earn a living he gave post-graduate classes in X-ray diagnosis of disorders of the skull, ear and nose. As a teacher he was superb. His classes, four a day, were well attended. Students whose interests were far removed from his ambit, i.e., gynæcologists and orthopædists, would enrol just to say they had studied under Schüller. During these years the telephone needed special attention; every call meant another student, and this meant money when that commodity was very difficult to come by. For his classes Professor Schüller collected an incomparable series of X-ray pictures, a veritable museum of every malady and disorder of the skull. Most of it was lost when he left Vienna.

After World War I X-ray film was scarce in Vienna and had to be used sparingly. Pictures were kept to a minimum, and Schüller employed only a few and essential projections. He acquired a magic skill in their interpretation. He was amazed, on coming to Australia, to see the excessive amount of film used in an individual examination, and to this apparent extravagance he but slowly became attuned.

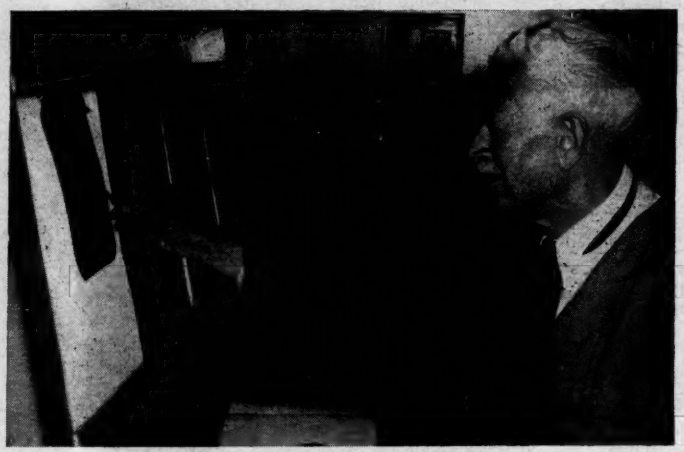
Before and after World War I his department was visited by eminent doctors from all over the world, and, in turn, he attended many congresses and accepted lecture tours, particularly in America, where he was on friendly terms with Cushing and Dandy. His contributions to the congresses were often the highlight. On one occasion in Chicago he made the mistake of lecturing in German, and the lecture was further disturbed by the fumbling of the illustrations. The result was complete failure. Happily the programme was reconstituted and, early next morning, he lectured in English. The illustrations were correctly set. He received an ovation.

During his lifetime he wrote more than three hundred books, monographs and papers, most of them while in Vienna. As indicated, they covered a diverse field in relation to X-ray examination of the skull, neurology, surgery and psychiatry. Schüller was very interested in epilepsy and wrote extensively about it. To be noted specially is his *"Craniocerebrale Schemata für die röntgenographische Lokalisation"*, written in collaboration with Urban in 1934, and his recognition of the disorder which he named osteoporosis circumscripta cranii, and which he liked to call his second bone disease. This is the early stage of Paget's

disease of the skull, which can be detected radiologically before symptoms appear. The "Craniocerebral Schema" may be considered the forerunner of the modern atlas for stereoencephalography. It was a favourite work, always carried in the professor's satchel along with his lunch and other necessities, of which he had few.

The Hitler regime brought difficulties and anxieties. At first slight, they mounted in intensity each year, and in 1938 they became intolerable. Earlier, he and his wife had decided to remain in Vienna; "we shall die here", he said, but in 1938 they decided hurriedly to leave. Of earthly possessions nearly all were left, including his two sons, who, at the last moment, were prevented from leaving Austria.

He spent a few months in Oxford and London and then came to Australia. When he arrived he was nearly sixty-five years old, and of necessity his mental and physical powers were on the wane. Even so, he set about the business of reconstituting his professional career in a foreign land. He settled in Melbourne, gave evening classes in röntgenology at his home, secured a room in the anatomy department at the University, to continue his studies and research—for this he was ever grateful, for he liked to be associated with the University—and practised in the city as a neurologist.



Straightway he came to St. Vincent's Hospital and remained there to the end. He worked in the X-ray department, where he was associated with the late Dr. John O'Sullivan (who was his pupil in Vienna) and the late Dr. Leo King. He was also busy in the department of neurology and neurosurgery. Although not a surgeon by training—the story tells that he was always surgically minded—he quickly adjusted himself to the needs of this art. He was at once the most helpful, charming and valuable colleague that one could wish to have. Always punctual and with every detail of the case under consideration at his command, he had a solution, as far as was possible, for every problem which presented. The long operating sessions were enriched and enlivened by his presence and by his keen discussion of the clinical, X-ray and pathological aspects of the case as the operation proceeded. In the course of operations his ever-active mind would be making original observations, e.g., the parchment syndrome, *"Das Pergament Symptom"*, which he described in 1949 in *Radiologica Austriaca*. For the rest he kept us informed of contemporary continental medicine, of the Vienna of his youth and middle age, its medical school, art and opera, of the doctors' orchestra (of which he was a member), of the members of the nobility and aristocracy whom he knew, and some of whom he treated. At St. Vincent's Hospital we were fortunate and honoured to be under the influence of this great man, and one feels that Australian medicine is much in his debt.

His greatest joy, I think, was to examine X-ray films. He would study a difficult case for hours on end, return to the problem many times, conduct a research, if need be, until finally he had the answer. As a rule he would sum up the problem in an instant and demonstrate to wondering eyes abnormalities of which they were unaware, though readily detected by the master. In a flash the essence of a difficult, and heretofore insoluble, problem was revealed. This I have seen many times. All this he did with little fuss or bother. A few essential projections without Potter-Bucky diaphragm were all that he required. Stereoscopic views told him no more than the single film. His extraordinary skill in interpretation of X-ray films followed a lifetime of close correlation of the clinic, of anatomy, of autopsies, and of X-ray technique, and was strengthened by his keen desire intellectually to be correct and properly to assist the consulting doctor and the patient. Were he to be incorrect, which was rare, he would admit the error with regret and humility, but one could thereafter sense a short phase of intellectual grief.

It was no wonder then that X-ray films came to him for interpretation from all over the world. One of the professor's endearing characteristics was his willingness to share his intellect and knowledge with anyone who asked. These requests received prompt and detailed acknowledgement in his own fine script. During his stay in Australia he was still busy writing and carrying on research, and a number of original and important papers appeared. In one he described cephalhæmatoma deformans, which he liked to call his third bone disease; Schüller-Christian disease and osteoporosis circumscripta cranii complete the triad.

During the last years of his life he was troubled by mental and physical ailments, all borne without complaint. Mental depression and insomnia plagued him, and these, no doubt, were contributed to by the loss of his two sons in a concentration camp during World War II. True to his progressive thinking, he prescribed leucotomy as treatment for himself, but one hesitated to dim such a mind even a little, and, happily, he was easily persuaded to forgo the fulfilment of his suggestion. Five years ago the development of a Parkinsonian-like rigidity and tremor contributed to a fracture of the femoral neck. From the operation of pinning the fractured bone he recovered in three weeks and walked thereafter without disability or support. During these years he came less frequently to the hospital and continued to make X-ray reports from his home. The films were sent from St. Vincent's Hospital and from the Repatriation Hospital, Heidelberg, where for some years he had worked in the X-ray department. The reports were still as careful and accurate as ever. Old age—*"Senectus ipsa morbus?"*—he would ask—and his other ailments took their toll and he came to St. Vincent's Hospital for the end. There he was carefully tended by the Sisters of Charity, who had been his friends ever since he came to Melbourne, and in particular by Sister Mary Cephas, of the X-ray department. He died in the company of his devoted wife, who shared his changing fortunes with the same courage and resignation as himself. To her, now the lone survivor of the household, the deepest sympathy is offered.

From what has been told one may judge that Professor Schüller was a remarkable man—in fact, a genius in medicine. To achieve a fraction of what he did would satisfy the yearning of most men. His genius was adorned by his perfect manners and nobility of character; in a lifetime one rarely meets his like.

Requiem Mass was held at St. John's Church, Heidelberg, where the celebrant, Reverend Father O'Connor, friend and confessor, preached the panegyric, which touched on the humility, the resolute faith, the comfort of his catechism, which supported the professor in success, sorrow and sickness.

His resting place is the cemetery adjacent to his home, 2 Mortimer Street, Heidelberg, which looks over the vista he loved so well.

Notes and News.

Rockefeller Foundation Grants.

In the list of Rockefeller Foundation Grants for the second quarter of 1958 we are pleased to note a grant of $30,000 in support of research in virology directed by Professor Frank Fenner at the Australian National University, Canberra. In the notice of this grant it stated that "Professor Fenner has done distinguished work on virus-host adaptation in myxomatosis. . . . His studies to date reveal that since its intro-

duction there have been both a reduction in the virulence of the virus and an increase in the resistance of the rabbits. Other researchers are working on the genetics and recombination of various other virus strains using examples drawn from three different classes of viruses. A third group is concerned with biochemical studies of the multiplication of viruses in tissue cultures."

Another notice of general interest to Australian scientific workers is that of a grant of $22,400 to the Waite Agricultural Research Institute of the University of Adelaide for the purchase and installation of an electron microscope. This instrument will be primarily for the use of the Department of Agricultural Chemistry, but will also be available to other sections of the institute and to the science departments of the University.

Smaller grants listed include one of £5000 to the University of Sydney for equipment for research in the Department of Medicine under the direction of Professor C. R. B. Blackburn; and one to Professor F. C. Courtice, of the John Curtin School of Medical Research, Canberra, to enable him to visit experimental pathology centres in the United States and Europe.

Second Asian-Pacific Congress of Cardiology.

We are asked to announce that the second Asian-Pacific Congress of Cardiology will be held in Melbourne during the last week in May, 1960. Further details may be obtained from Dr. A. E. Doyle, Honorary Secretary, at the Alfred Hospital, Melbourne, S.1, Victoria.

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE following additions and amendments have been made to the Register of Medical Practitioners for New South Wales in accordance with the provisions of the *Medical Practitioners Act*, 1938-1958.

Registered medical practitioners who have complied with the requirements of Section 17 (3) and are registered under Section 17 (1a) of the Act: Hingston, Geoffrey Harold, M.B., B.S., 1955 (Univ. Melbourne); McKinnon, Donald Campbell, M.B., B.S., 1957 (Univ. Adelaide).

Registered medical practitioners who have complied with the requirements of Section 17 (3) and are registered under Section 17 (1b) of the Act: Lindsay, Richard Henry George, M.B., Ch.B., 1950 (Univ. Cape Town); Shedden, John Dallas Alexander, M.B., Ch.B., 1951 (Univ. Glasgow); Steele, Jane Mackie, M.B., Ch.B., 1953 (Univ. Aberdeen); Thompson, Arthur Trevor, M.B., Ch.B., 1953 (Victoria Univ., Manchester).

Registered medical practitioner who has complied with the requirements of Section 17 (3) and is registered under Section 17 (1c) of the Act: Slavotinek, Hynek, M.D., 1926 (Univ. Brno).

Registered medical practitioner who has complied with the requirements of Section 17 (3) and is registered under Section 17 (2A) of the Act: Lewin, Abraham, M.D., 1912 (Univ. Breslau).

Registered medical practitioner who has complied with the requirements of Section 17 (3) and is registered under Section 17 (2B) of the Act: Roth, Lajos, M.D., 1937 (Univ. Cluj).

Registered medical practitioners who are required to complete twelve months' hospital service in accordance with the provisions of Section 17 (3) and are registered under Section 17 (1a) of the Act, the qualifications in each case being M.B., B.S., 1958 (Univ. Sydney): Abbott, John Laurence; De Zwart, Frans Hendricus Wilhelmus; Feller, Keith Hyman; Holland, Howard John; Hunter, Hector John; Hussain, Mohammed Yusuff; Jones, Reginald Cruikshank Stuart; Lo, Adela Sook Ling; Ma, Gabriel Wai Chiu; Mah, Gerald; Oen, Eng-Yat; Oey, Vincent Bie Hiong; Robinson, Kenneth Gordon; Sommers, Ronald Albert David; Thomas, Maxwell Sydney.

Registered medical practitioners who are required to complete twelve months' hospital service in accordance with the provisions of Section 17 (3) and are registered under Section 17 (1c) of the Act: Wechsler, Helen, M.D., 1938 (Univ. Vienna); Zawadzki, Stefan, M.D., 1949 (Univ. Lodz).

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JULY 26, 1958.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	..	3(1)	5(3)	..	..	..	..	..	8
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	1	..	..	..	..	..	3	..	4
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	1	..	..	..	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	3(2)	18(15)	3(1)	3	..	..	..	2	29
Diphtheria	..	..	2	..	..	..	..	..	2
Dysentery (Bacillary)	..	..	3(2)	3(3)	..	..	2	..	8
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	71(33)	31(21)	4	2(2)	2(2)	2	..	..	112
Lead Poisoning	..	..	1(1)	..	..	..	..	..	1
Leprosy	..	1(1)	..	..	..	..	..	..	1
Leptospirosis	..	..	4(2)	..	..	..	..	..	4
Malaria	..	..	..	..	..	..	..	..	..
Meningococcal Infection	2	4(2)	..	..	1(1)	..	..	..	7
Ophthalmia	..	..	..	..	1	..	..	..	1
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	..	..	..	..	..	..	..	..
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	25(17)	..	2(2)	67(64)	..	..	..	94
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	22(9)	46(33)	7(4)	5(3)	6(3)	2(2)	..	..	88
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	1	..	1(1)	..	..	..	..	2
Trachoma	..	..	..	..	1(1)	..	1	..	2
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	35(26)	13(16)	11(3)	5(5)	3(2)	..	..	..	67
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	1(1)	..	..	..	..	..	1
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

The following has been issued with a licence in accordance with the provisions of Section 21c of the Act: Staden, Janina, M.D., 1941 (Univ. Stalino, Ukrania).

TASMANIA.

The following have been registered, pursuant to the provisions of the *Medical Act*, 1955, of Tasmania, as duly qualified medical practitioners: Chiswell, Douglas Albert, M.B., B.S., 1952 (Univ. London), L.R.C.P. (London), M.R.C.S. (England), 1952, D.T.M. & H. (Liverpool), 1957; Brennan, John Dermond, M.B., B.S., 1955 (Univ. London); O'Neill, James Patrick, M.B., B.S., 1950 (Univ. Melbourne); Chalmers, Thomas Phillips, M.B., Ch.B., 1943 (Univ. St. Andrews).

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Annual Subscription Course.

Professor Charles Illingworth, C.B.E., M.D., F.R.C.S., Professor of Surgery, University of Glasgow, Lucas Tooth Visiting Professor to the Brisbane General Hospital, will visit Sydney from August 26 to 31, 1958. By arrangement with the Committee, he will be guest professor during the Reunion Week at The Royal North Shore Hospital and will give the following lectures in the Students' Lecture Room: Tuesday, August 26, 3.30 p.m., "Surgery of Peptic Ulcer"; Wednesday, August 27, 3.30 p.m., "Œsophageal Stricture"; Thursday, August 28, 2.15 p.m., "Hormonal Control of Cancer"; Friday, August 29, 11.30 a.m., case presentation; Friday, August 29, 2.15 p.m., "Sequelæ of Gastric Surgery".

Professor Illingworth will also give the following lecture in conjunction with the New South Wales Branch of the British Medical Association in the Robert H. Todd Assembly Hall, 135 Macquarie Street, on Thursday, August 28, at 3 p.m.: "Gall-Stones and Jaundice."[1]

Miss Norah Gibbs, Chief Psychologist of the Child Guidance Training Centre, London, will be guest speaker at the eighth Australian Pre-School Association Conference, which will be held from August 30 to September 5, 1958. Arrangements have been made for Miss Gibbs to give the following lecture at the Royal Alexandra Hospital for Children on Friday, August 29, at 1.15 p.m.: "Special Education and Health Services for Children."

Medical Appointments.

Dr. W. A. J. Brady has been appointed Psychiatric Superintendent, Mental Hygiene Branch, Department of Health, Victoria.

Dr. P. A. Reed has been appointed Senior Medical Officer, Mental Hygiene Branch, Department of Health, Victoria.

Dr. A. A. Tye has been appointed Honorary Assistant Ophthalmologist at the Royal Adelaide Hospital, Adelaide.

Dr. H. J. Ellis has been appointed Honorary Assistant Anæsthetist at the Royal Adelaide Hospital, Adelaide.

Nominations and Elections.

The undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Lewin, Abraham Arthur, M.D., 1912 (Univ. Breslau) (registered in accordance with the provisions of Section 17 (2a) of the *Medical Practitioners Act*, 1938-1958), 4 Birriga Road, Bellevue Hill, New South Wales.

Congdon, Roger George, M.D., B.S., 1955 (Univ. London), 21 Dover Road, Rose Bay, New South Wales.

Becroft, Thelma Constance, M.B., Ch.B., 1950 (Univ. New Zealand), C. J. and Mildred Tinsley Hospital, Baiyer River, via Goroka, T.N.G.

[1] By arrangement with the New South Wales State Cancer Council this lecture will be open to all medical practitioners.

Deaths.

The following deaths have been announced:

Gandevia.—Eric Neville Harle Gandevia, on July 25, 1958, at Melbourne.

White.—Edward Rowden White, on July 31, 1958, at Melbourne.

Goddard.—Gerald Windett Goddard, on August 1, 1958, at Sydney.

Luddy.—John Joseph Luddy, on August 1, 1958, at Brisbane.

Ryan.—Harold Alexander Ryan, on August 6, 1958, at Bondi, New South Wales.

Diary for the Month.

Aug. 18.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.
Aug. 19.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Aug. 20.—Western Australian Branch, B.M.A.: General Meeting.
Aug. 21.—Victorian Branch, B.M.A.: Executive Meeting.
Aug. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
Aug. 22.—Queensland Branch, B.M.A.: Council Meeting.
Aug. 26.—New South Wales Branch, B.M.A.: Hospitals Committee.

Medical Appointments: Important Notice.

Medical practitioners are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales. Anti-Tuberculosis Association of New South Wales. The Maitland Hospital.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

All articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to The Medical Journal of Australia alone, unless the contrary is stated.

All communications should be addressed to the Editor, The Medical Journal of Australia, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

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